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ACORN USER

JULY 1987

BEST-SELLING AND BIGGEST BBC/ACORN MAGAZINE



BBC DOMESDAY: Devise your own video sequences

PREVIEW: Page layout aid for View

DFS TO ADFS: Trouble-free file transfer

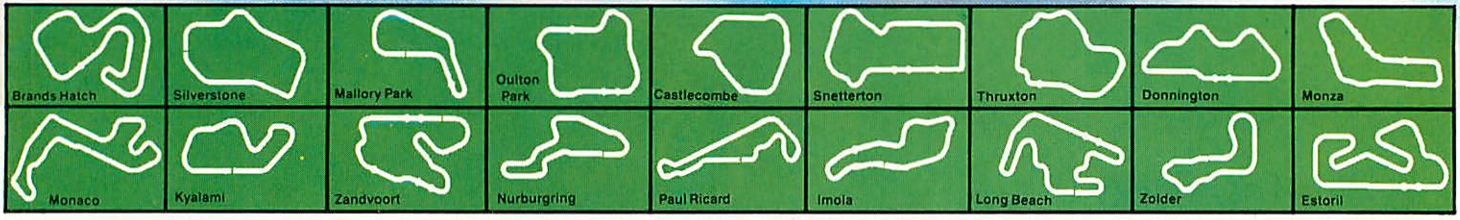
BIRTHDAY: Now we are five

Competition page 110

COMPLETE COMMS

Going on line





Drive into a New Dimension

Grand Prix Construction Set is a motor-racing game with a difference: it allows you to design your own race circuits — using straights, fast bends, sharp bends, chicanes and hump back bridges. Or you can select one of the many pre-defined race tracks, which include most of the world's famous Grand Prix venues. Then race against another player, or against the computer — there are 5 skill levels to choose from.



The Circuit Designer



On the First Lap

Features of the Game

- Easy-to-Use, Icon-Driven Circuit Designer
- Save and Load your own Track Designs
- 18 Pre-Defined Grand Prix Race Circuits
- 1-Player and 2-Player Options
- Spectacular Split-Screen View of the Race
- Dramatic Skids and Crashes

BBC Micro cassette	£9.95
BBC Micro 5¼" disc	£11.95
BBC Master Compact 3½" disc	£14.95

Grand Prix Construction Set is compatible with the BBC B, B+ and Master Series computers.

SUPERIOR SOFTWARE Limited

ACORNSOFT

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Special Offer Prices valid until Sept 10th 1987

5¼ Micro Media Brand Discs

	10	20	30	50	100
SS/DD	6.99	13.10	18.70	29.50	55.80
DS/40T	8.50	16.00	22.75	35.90	67.60
DS/80T	9.99	18.70	26.35	41.05	76.35
DS/HD for PCAT	24.15	46.25	66.25	105.25	200.10

5¼ Reversible discs (Flippy's)

Have two write protect notches & index holes.
Suitable for single sided drives.

	10	20	30	50	100
	10.25	19.55	27.15	42.25	78.45

3½ Micro Media Brand

	10	20	30	50	100
SS/DD	19.99	38.40	55.50	87.25	163.90
DS/DD	21.99	42.55	61.60	96.90	182.30

5¼"

All discs supplied are with labels, 5¼" write protects, envelopes & hub rings.

Discs purchased direct from one major manufacturer. 100% certified error free – lifetime guarantee.

PRICES INCLUDE V.A.T.

3½"

5¼ Rainbow Discs come in five colours

	20	50	100	250	500
SS/DD	13.20	30.75	57.10	134.50	252.45
DS/40T	14.35	33.10	60.70	141.45	262.20
DS/80T	15.20	35.20	64.85	148.75	276.00

5¼ Unbranded Discs

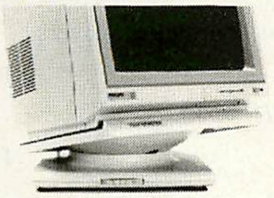
	20	50	100	250	500
SS/DD	9.65	22.45	41.40	97.10	181.13
DS/40T	10.95	25.00	45.55	105.25	193.20
DS/80T	11.85	26.73	49.55	116.45	216.20

3½ Unbranded Discs

	10	30	50	100	150
SS/DD	14.95	42.95	61.50	111.65	164.50
DS/DD	16.70	48.30	78.20	147.20	212.20

SUMMER SALE · SUMMER SALE · SUMMER SALE · SUMMER SALE · SUMMER SALE

Monitor Swivel Bases



Pan tilt revolves around 360 degrees 12.5 degrees tiltable up and down Adjustable by front mechanism.

55x280x260mm for 12" Monitors		55x355x320mm for 14" Monitors	
1	13.25	1	16.70
3+	12.60ea	3+	15.90ea
6+	11.95ea	6+	15.05ea

Adjustable Copy Holder



A4 adjustable desk clamping. Magnifying cursor line. Paper thickness adjustment. Paper height adjustable clip.

A4 Version 24.00
Holds up to 300g

Desk Top Version 13.69
Holds up to 1000g

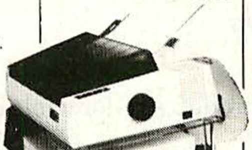
A3 Version 42.45
Holds up to 1400g

Printer Stand

5mm perspex

80 Column Version
400 x 310 x 100mm 22.80

132 Column Version
600 x 310 x 100mm 28.60



Mobile Printer Stand



Rugged steel frame. Height adjustable basket for output paper & base shelf for input paper. Self assembly – includes castors.

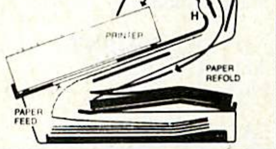
80 column £50.00
132 column £65.00

The Space Saver



Paper feed and refold positioned one above the other. Dial controlled paper feed with adjustable deflectors ensures smooth flow and automatic refolding.

80 column 414x380x460mm		132 column 530x380x460mm	
1	34.40	1	43.00
3+	32.10ea	3+	40.70ea
6+	30.50ea	6+	38.65ea



Printer Ribbons

	3	6	12
Acorn AP80	7.25	13.80	25.55
AP100	7.40	14.15	26.20
Brother M1009	8.10	15.50	28.95
Colours	12.30	24.60	49.20
HR15 MS	10.70	20.70	39.35
Fabric	11.05	21.40	40.70
Canon PW1156/1080	7.95	15.20	28.30
Centronics GLP	8.10	15.50	28.95
Colours	12.30	24.60	49.20
Epson FX/MX/RX 80/85	7.25	13.80	25.55
Colours	13.20	26.40	52.80
LX/GX 80	6.90	13.10	24.15
Colours	12.60	25.20	50.40
MX/FX 105	8.80	16.90	31.75
LQ 800	10.00	19.30	36.60
Juki 6100 MS	7.25	13.80	25.55
5510	7.25	13.80	25.55
Colours	13.20	26.40	52.80
Kaga KP810/910	7.95	15.20	28.30
Colours	13.20	26.40	52.80
M/Tally MT80 MS	10.70	20.70	39.35
NEC PC8023	11.75	22.75	43.45
Colours	15.30	30.60	61.20
Panasonic KXP110/1080	10.70	20.70	39.35
Colours	19.35	38.70	77.40
Seikosha GP80	7.25	13.80	25.55
GP100	7.40	14.15	26.20
Shinwa CP80 MS	10.70	20.70	39.35
Star NL10	18.60	36.60	71.10

Colours available – Red/Brown/Blue/Green & Yellow

If the ribbon you require is not listed please let us quote

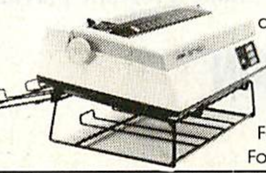
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MD 120

5¼" x 120
1 12.55
3+ 11.90 each
6+ 11.35 each

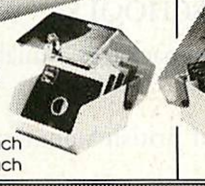


Wire Printer Stand



stacks print-out in document tray automatically. Suitable for most standard printers. Made of safety coated steel wire.
For 80 column £14.80
For 132 column £16.60

MD 50



5¼" x 50
1 7.80
3+ 7.40 each
6+ 7.10 each

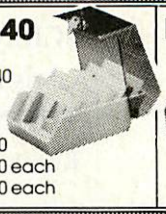
MD 100



5¼" x 100
1 10.80
3+ 10.30 each
6+ 9.80 each

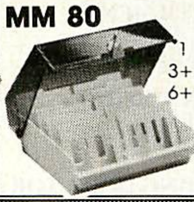
MM 40

3½" x 40



1 8.30
3+ 7.90 each
6+ 7.50 each

MM 80



3½" x 80
1 10.95
3+ 10.40 each
6+ 9.90 each

Computer Labels

Continuous fanfold, sprocket fed

	Price per 1,000	3,000
70 x 36	4.80	13.20
89 x 36	4.90	13.50
89 x 49	6.80	18.30
102 x 36	5.20	14.40

Please state no. of labels across the sheet (1, 2 or 3)

Computer paper

Plain fanfold, micro perf edges

Size	Weight gsm	1000s per box	Price per box 1 box	3 bxs +
11x9½	60	2	16.50	46.80
	80	2	20.40	56.10
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	90	1	17.40	43.80

A4 Fixed tractor paper available

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ACORN USER

ISSUE No 60 JULY 1987

NEW USERS

REVIEWS

EDUCATION

REGULARS

Published by Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF. Tel: 01-836 2441. Subscriptions: Contact Gail Fairhall, Redwood Publishing Ltd, Lambourn Woodlands, Newbury, Berks. Tel: (0672) 40888. UK £17.50; Europe £25; Middle East £30; Americas, Africa £35; rest of the world £40; (prices include p&p for 12 issues). Printed by Watmoughs Ltd, Bradford. Typesetting by Tabloid Fotoset, London. Colour reproduction by Screencharm London. Print production by Aquarius Print and Design, London. Distributed by Comag, Tavistock Road, West Drayton, Middlesex.

ABC

FEATURES

COVER



Illustration by Rosemary Harrison

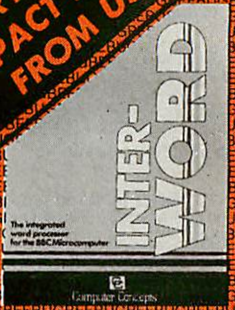
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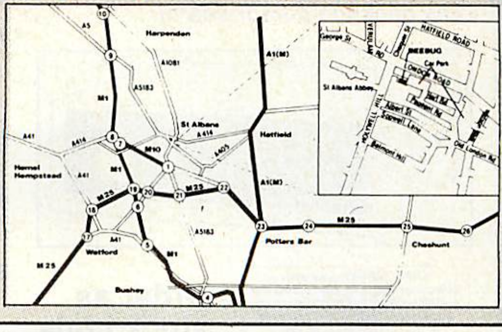
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Tel: 0727 40303—Multi-Lines
Alternatively come along and see us. We are open Mon-Sat 9-5.30 and Thursday 9-8.00pm



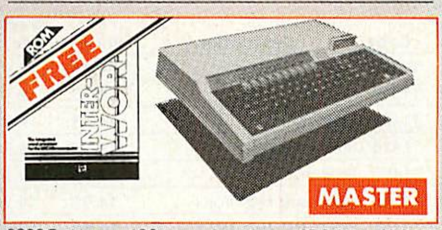
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0197G	Compact+Mono Monitor	544.00	516.80
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0227F	Second 3 5" Disc Drive	108.00	102.60
0201B	Compact RS232 Interface	29.90	28.41
0211C	PAL TV Adaptor	29.90	28.41
0250C	Compact 5.25 Disc Lead	12.32	11.70
0298B	Compact Printer Lead	9.77	9.29



0200G	Master 128	474.00	450.30
0202G	Master ET	381.32	362.25
0240C	M128 Manual 1 ADJ22	14.95	14.20
0241C	M128 Manual 2 ADJ23	14.95	14.20
0242C	M128 Adv Ref Man (JULY'87)	19.00	18.05
0234B	M128 Econet Module	48.88	46.43
0235B	M128 Eprom Cartridge	15.18	14.42
0230C	M128 65C102 "Turbo"	119.00	113.05
0231D	M128 80186 Co-Proc	228.85	217.41
0233F	Uni 2nd Proc.	83.00	78.85
0206F	Acorn Teletext Adaptor	115.00	109.25
1012B	Advanced Teletext ROM	7.99	7.59
0237F	Acorn IEEE Interface	322.00	305.90

1770 UPGRADE

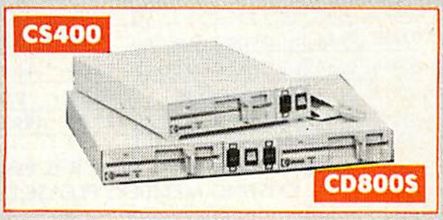
0217B	1770 Disc Interface	50.24	47.73
0218B	ADFS Upgrade 1770	29.33	27.86



0299G	Panasonic KX-P1081	180.00	171.00
0308G	Epson JX 80 Colour	520.00	494.00
0310G	Juki 6100 Daisywheel	362.25	344.14
0311G	Taxan Kaga KP815	350.00	332.50
0316G	Taxan Kaga KP915 15"	440.00	418.00
0328G	Epson FX800	405.00	384.75
0322G	LX86 Printer	275.00	261.25
0327G	Star NL-10	285.00	270.75
0401A	2M Printer Lead	8.00	7.60
0406D	11" *9.5" Paper 2000	14.03	13.33
0407C	1000 3.5" Labels (1 across)	5.64	5.35
0454C	2000 3.5" Labels (2 across)	10.90	10.36

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0501G	Kaga KX1202 Green	116.00	110.20
0502G	Kaga KX1203 Amber	116.00	110.20
0556B	BNC Monitor Lead	3.90	3.70
0503G	Zenith 123 12" Green	83.00	78.85
0504G	Zenith 122 12" Amber	87.00	82.65
0530G	Microvitec 1431 Mon.	239.00	227.05
0531G	Microvitec 1451 Mon.	289.00	274.55
0550B	1.0m Mon. Lead RGB	5.75	5.46
0573C	14" Swivel Monitor Stand	14.50	13.78
0535G	Supervision III RGB	379.50	360.52
0536B	Supervision II RGB	318.55	302.62
0555B	Supervision Mon. Lead	7.00	6.65
0570D	Kaga Stand with Digital Clock	29.00	27.55
0572C	Kaga Mon. Stand KT3	19.00	18.05

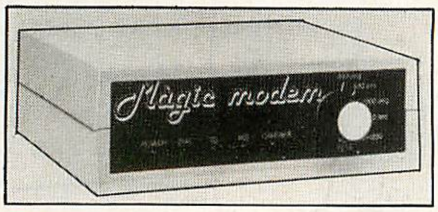


0600F	Cumana CSX100 40T	106.95	101.60
0601G	Cumana CDX200 40T	215.00	204.25
0602F	Cumana CSX400 40/80T	142.60	135.47
0610F	Cumana CS100 40T	126.50	120.18
0603F	Cumana CS400 40/80T	162.15	154.04
0620F	Cumana Original CS400	147.37	140.00
0604G	Cumana CD800S 40/80T	286.35	272.03
0614F	Cumana CS100E	118.45	112.53
0615F	Cumana CS400E	155.00	147.25
0611A	Cumana Disk Guide	1.90	1.81
0650B	10 x Memorex DiscsSSDD 40	15.50	14.73
0651B	10 x Memorex Discs DSDD 80	25.50	24.22
0669B	10 x Memorex 3.5 Discs	25.00	23.75
0652A	Disc Head Cleaner 5.25"	9.65	9.17
0648A	Disc Head Cleaner 3.5"	9.65	9.17

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S/2908/3/G/500406

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   * Auto-dial
   * Auto-answer
   * Fully BT approved
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A & B COMPUTING MAY 87

...has an amazing 50 commands in its repertoire.

...it's one of the best Beeb terminal packages to have been released in a couple of years, and full of potential.

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It is very flexible and powerful...

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EDUCATIONAL COMPUTING MARCH 87

WATFORD HARDWARE

Code	Description	Price	Mem Price
0213B	Watford DFS Rom+Man	27.49	26.11
0214B	Watford DDFS Kit	56.35	53.53
0216B	Watford DFS Manual	6.95	6.60
0219B	Watford DFS Kit	62.10	59.00
0702B	Watford 32K RAM Card	67.28	63.91
0709D	Watford Eprom Eraser	33.35	31.68
0717B	Watford Sideways ZIF	17.83	16.93
0736B	Watford 12 Rom Board	36.80	34.96
0737B	Watford Battery	4.37	4.15
0750B	Watford S/State 16K	32.20	30.59
0751B	Watford 16K Module	32.20	30.59
0752B	Watford Diagnostic Disc	23.00	21.85
0753B	Rom/Ram Board 64K	67.85	64.46
0754B	Rom/Ram Board 128K	102.35	97.23
0755B	Writer Protect Mk12	2.76	2.62
0739C	Video Digitiser	113.00	107.35
0756B	Eureka Card	102.00	96.90
0429B	Watford NLQ Epson	28.75	27.31
0748F	Co-Proc Adaptor (End 4/87)	55.00	52.25

OTHER HARDWARE

Code	Description	Price	Mem Price
0701B	Aries B32 RAM Card	93.15	88.49
0740B	Aries B12 ROM Board	46.00	43.70
0749B	Aries B12C Adaptor	5.87	5.57
0704B	ATPL ROM Board BBC	39.67	37.69
0718B	Delta 3B Single Joystick	9.99	9.49
0719B	Delta 3B Twin Joysticks	17.00	16.15
0720B	Delta 14B Joystick	12.50	11.88
0721B	Delta 14B/1 Interface	13.00	12.35
0773B	Delta 3S Compact Joystick	9.99	9.49
0774B	Delta 3SO Optical Feedback	18.00	17.10
0741A	Delta ASC/B Interface	8.50	8.07
0764F	Red Box Starter System	129.00	122.55

Code	Description	Price	Mem Price
0765D	Red Leader	59.95	56.95
0766D	Red One	34.95	33.20
0767D	Red Two	34.95	33.20
0775F	Red Five	49.95	47.45
0770B	13 amp Spike Plug	11.99	11.39
0771B	3 way Spike Adaptor	15.00	14.25
0772B	4 way Spike Block	14.50	13.78

ACORN COMPACT SOFTWARE

Code	Description	Price	Mem Price
1050B	Compact Viewsheet	59.80	56.81
1051B	Compact Viewspell	39.85	37.86
1052B	Compact Viewstore	59.80	56.81
1053B	Compact Viewindex	14.95	14.20
1054B	Compact Viewplot	29.95	28.45
1055B	Compact Printer Driver	11.50	10.93
1056B	Compact PASCAL	69.00	65.55

3.5" GAMES FOR MASTER COMPACT

Code	Description	Price	Mem Price
1136B	Elite	19.95	18.95
1139B	Revs incl 4 Tracks	19.95	18.95
1140B	Citadel	14.95	14.20
1141B	Strykers Run	14.95	14.20
1142B	Repton 3	14.95	14.20
1144B	Acornsoft Hits Vol 1	14.95	14.20
1146B	Acornsoft Hits Vol 2	14.95	14.20

ACORNSOFT APPLICATIONS

Code	Description	Price	Mem Price
1000B	View 2.1	44.28	42.06
1022C	View 3.0	66.70	63.36
1286B	View 3.0 User Guide	10.00	9.50
1013B	View Driver Cassette	8.62	8.19
1014B	View Driver Disc	9.77	9.29
1002B	Hi-View	44.28	42.06
1021B	Viewindex Disc	13.80	13.11
1043B	Viewspell Rom	34.02	32.32
1001B	Viewsheet	44.28	42.06
1279B	Viewsheet User Guide	10.00	9.50
1030B	ViewPlot	25.30	24.04
1019B	Viewstore Rom	44.28	42.06
1008B	Basic Editor	28.00	26.60
1017B	GXR ROM for the BBC B	28.00	26.60
1018B	GXR ROM for the BBC B+	28.00	26.60
1031B	Termulator Rom	31.05	29.50
1035B	6502 Development	45.00	42.75
1037B	Database Cassette	11.50	10.93
1038B	Database Disc	14.50	13.78
1039B	Creative Sound Disc	19.00	18.05
1040C	Micros in Business Pack	47.27	44.90

BEEBUG BLANK DISCS

Code	Description	Price	Mem Price
0657B	10x 40T SS DD Discs	9.90	9.41
0658B	10x 40T DS DD Discs	10.42	9.90
0659B	10x 80T SS DD Discs	10.42	9.90
0660B	10x 80T DS DD Discs	10.90	10.36
0661E	25x 40T SS DD Discs	23.00	21.85
0662E	25x 40T DS DD Discs	26.47	25.15
0663E	25x 80T SS DD Discs	26.47	25.15
0664E	25x 80T DS DD Discs	29.00	27.55
0665E	50x 40T SS DD Discs	48.00	45.60
0666E	50x 40T DS DD Discs	50.00	47.50
0667E	50x 80T SS DD Discs	50.00	47.50
0668E	50x 80T DS DD Discs	53.00	50.35

BEEBUG HARDWARE

Code	Description	Price	Mem Price
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NEWS

Correction to June competition

There's a slight hitch in our June competition to win a *Sentinel* badge. Originally we asked you for the code for level 9999, and to answer three questions. Alas, the code has now been published, so we feel that it's unfair on people who've struggled to the top level to compete with others who don't even have the game!

So forget the code. What we want now is for you to produce a screen shot of a meanie on the *Sentinel*'s tower. And we still want the answers to those three simple questions.

Sidekick for BBC



Windows over frozen screen

Maze Technology's new *SideKick*-type pop-up program for the BBC is called *Sideset*. It allows you to freeze whatever program you are currently running, and then use any of the other functions of the machine before resuming.

The program could be useful as a de-bugging tool, as well as allowing the functions to be used at any time. For example you can use Basic commands from *View*, or suspend a spreadsheet to play a quick game of *Repton 3*! A number of utilities are supplied on disc to use with *Sideset*, including a calculator, diary, address book and notepad. The package, for the BBC B and Master series, comes on a ROM and DFS/ADFS compatible disc and costs £39.95 plus VAT.

RISC micro details revealed

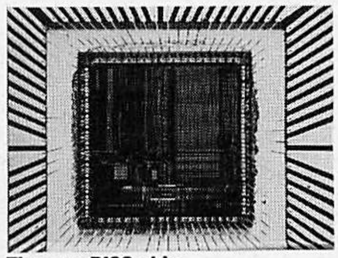
By Steve Mansfield

It's now thought the entry-level RISC-based machine will be under £1000.

This micro will have 512k RAM, with a 1Mb version available. However, the system is capable of supporting 4Mb of memory – this is the amount of RAM on the RISC second processor development system – so a version with this amount of memory is possible.

The development micro shown on BBC's *Micro Live* programme ran the PCW Basic benchmarks 10 times faster than the BBC B. However, speed increases could be as much as 30-fold with machine code programs.

Acorn has provided extensive add-on facilities on the micros.



The new RISC chip

The curiously-named 'podules' can be used for second processors, music interfaces and other intelligent peripherals.

Acorn has developed software to emulate the BBC micro's 6502 processor. Called *65emu*, this should run legal BBC software, but the emphasis is heavily on languages, and unfortunately most games are still unlikely to work.

Programs written properly in Basic should run on the new machine's standard language.

Many software houses are working on programs for the machines including desktop publishing, databases, games and graphics (see page 17).

■ In a possibly unconnected move, Advanced Memory Systems is changing the colour of its AMX mouse to pale grey with red buttons.

ACP launches ACP

Master 128 owners still grappling with the machine's configuration might benefit from Advanced Computer Products' latest release.

Co-incidentally bearing the same initials as the company, the *Advanced Control Panel* is based on the program supplied on the Master's Welcome disc. But John Huddlestone told us: 'We took the idea then threw away that program'.

ACP's chip-based program acts as a 'front-end' to the micro. Pull-down windows enable you to load and save ROM images, switch ROMs on and off, go into another language and set the machine configuration. Screen colours, disc drive options, serial port configuration and so on can be set from menus, and these set-ups can be saved and re-loaded, so you can use different configurations for different applications.

The software also provides an on-screen calculator, which works in decimal, hex and binary. And there is an alarm function which can either make a sound at the required time or issue a star command, such as *EXEC. *ACP* is written as a language, so programmers can create their own control panels. *ACP* costs £34.50.

Baker pushes new IT drive

Education Secretary Kenneth Baker has unveiled a £19 million pre-election plan for making better use of information technology (IT) in schools, involving a new elite corps of classroom computer advisers.



Baker: New hi-tech advisers

The five-year package should improve the micro-pupil ratio, and attach more peripherals to school equipment.

Most important was the decision to set up a 750-strong team of advisers to train teachers in the effective use of their equipment.

Foreign Folio

The *Folio* wordprocessor from Tedimen Software has been made multi-lingual. It's now available in French and German versions, both giving you the option of editing characters and key assignments for special symbols. And a separate *European Language Development Pack* provides facilities for creating complete alphabets, like Greek or Russian.

As well as its language skills, *Folio* also provides access to a wide variety of printer fonts. Prices for these versions have yet to be finalised, but licence deals will be available.

News in brief

■ A local viewdata system for networked BBC micros has been launched by Odyssey Software. *TeleFax* works across Amcom's E-Net system and allows a database of teletext to be called up with a single command. It comes with full screen editor for creating the pages and a program which can be used to display pages automatically. The price is £30 from Odyssey Software.

■ Rice Computer Electronics has updated the software for its drum synthesiser. The new software allows drum patterns to be saved under user-defined filenames, and there is greater control over timing. Other improvements include echo effects and better graphics. The Rice Drums cost £45 with cassette-based software and £47.50 on disc. Existing owners can get the upgrade for the cost of postage and packing.

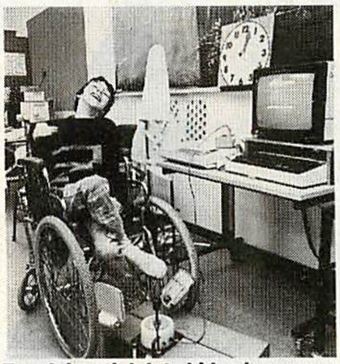
■ Terrell Electronics has a product which allows up to four micros to share one printer. Two versions are available to take three or four BBC micros. The system is very simple using hardware switches. The prices are £59.50 and £69.50 for the three and four micro versions. Cables for the Compact are available at £2 extra each.

Prize to help kids

An award scheme for products which help cerebral palsy children is generating a good response, including two devices designed specifically for the BBC micro.

Datasolve launched the scheme on February 9, and some of the best entries were shown to companies at the Computer Industry Charity Ball in June. The award schemes open to small companies and individuals making micro-technology products, and has so far attracted 20 entries. Among them are the Photonic Wand from the company of the same name, and a games joystick available from Interface Designs.

The Photonic Wand is like a long-distance light pen. It's used to point at the screen, but works up to two metres away. At this distance, very small movements are needed. The wand can also be used close to the screen, where larger movements are required, which is useful if a child is prone to severe involuntary motion.



Tough joystick lets kids play games

The £100 Photonic Wand includes keyboard emulation software which allows it to be used with a wide range of programs. It's already being used with music, painting and even wordprocessing packages.



Wand helps movement problems

The joystick is mainly intended for games. It features a rugged construction and large stick movement, which is essential for children with restricted limb movement or restricted control.

There is a fire button set into the top of the stick but for children who can't manage that, there is also an automatic fire option.

The joystick uses digital switching, rather than full analogue control, as this helps make the product more robust, and fine control is rarely needed with cerebral palsy children. Only a few games, like *Aviator*, need analogue control, so the stick is compatible with the vast majority of BBC micro software titles. The price of the joystick is £60.40.

Wordwiser still

Wordwise has been improved again. With the full backing of Computer Concepts, the makers of the original *Wordwise*, Interface Electronics (IFEL) has produced *Wordwise + II*.

With the new version, virtually every key has a special function when used with the Control key. For example, pressing CTRL-X allows search and replace operations while still in edit mode and CTRL-E allows you to choose printer codes from a drop-down menu.

Over a dozen of these functions have been added. IFEL has included the programming language extensions from its previous product, *Wordwise +*.

The new ROM is accompanied by a disc with utilities which include mail merging and label printing.

The price is £53.95, but existing *Wordwise* owners can get a discount of about £22.

■ The *Word-Ex* ROM from Norwich Computer Services adds to *Wordwise +*, rather than replacing it.

The chip gives you facilities such as menu-driven loading and saving of files, function key editing, high speed sorting of paragraphs, automatic case changing and an on-screen help menu. The cost of the chip is £30, available from Norwich Computer Services.

■ The *Wordpro* disc-based package from Softec, which also adds extra features to *Wordwise +*, has been dropped in price from £23 to £15.95.

Extra memory

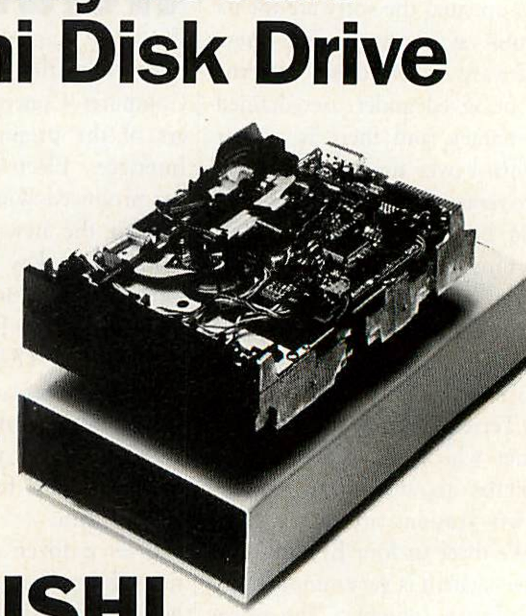
Morley Electronics has brought out two new products for the Master 128.

The Master Board AA is an internal ROM board which takes up to eight 16k chips, or four 32k chips. It does this without occupying any of the slots used by the sideways RAM or the cartridge sockets.

The Master Board comes with supporting software on a chip which provides file transfer routines and an ADFS disc formatter as well.

The other product is a 256k memory cartridge which can be used with the standard disc filing system (DFS). It obeys all the normal DFS commands, and allows files to be saved and loaded very fast. The prices are yet to be announced, but should be around the £40 mark.





The Comms Column

■ Any comms addicts' phone usage is greatly increased when a modem is let loose. It's not uncommon to find many Prestel and bulletin board users on-line for hours.

For them Mercury Communications has introduced the Mercury 2200 service. For an initial charge of around £50, which includes a smart push-button telephone, Mercury will connect you to its network. Its charges are 15-25 per cent cheaper than BT's, and minimum charges for calls are less as the costs are based on a shorter time unit.

Unfortunately, Mercury only works on trunk calls, so it doesn't save on the local call to Prestel or your neighbour's bulletin board.

The system is digital, so the quality of the lines is dramatically improved – and you can connect to it using your existing line and socket. Mercury deals with the billing, which is itemised call by call.

It is probably not of much use to anyone whose quarterly bill is less than £80, but when long distance calls are a regular occurrence, Mercury could help keep down the bills. Contact Mercury on a free number, 0800 424 194.

■ Dataphone has launched a comprehensive comms package for just £6.50, offering call timing and a 300-number store. It is compatible with Demon and Magic Modems. More details on (0733) 230240.

■ The Wizard's Shop bulletin board has been renamed CLUB 1512 and is now running 24 hours a day, seven days a week on 01-204 8755.

It is based on an Amstrad PC, and its memory contains a phenomenal amount of BBC micro software, including some *Music 500* files. At present, 300/300 full duplex, and 1200/75 speeds are supported.

Buzz

Prestel turns to Gold

Prestel has finally linked up with Telecom Gold in a move that heralds the end of incompatibility between electronic mail systems.

Using a special 'gateway', messages can now be sent between the systems. Micronet has been the first to take advantage of this with a service called Interlink. This gives Micronet users access to Gold's facilities. Other Prestel special interest groups are likely to follow suit with their versions of Interlink.

Electronic mail companies, like Gold, One-to-One and Easylink, have been talking for a long time about linking their systems. A major problem with email is that the recipient has had to have an account on the same system as the sender. Interlink is the first real step to overcoming the problem.

When Micronet users join



Micronet is expanding

Interlink they are given a Telecom Gold mailbox on system 74. This means they can go directly into Gold as well as through the Prestel gateway.

The main advantage with Interlink is for people who need both Prestel and Gold messaging facilities. One phone call will now allow you to read and send all your mail and telexes.

One possible drawback is that you still have to use Prestel's 40-column viewdata screen. But new software should help alleviate some of the problems, by splitting messages into page-size chunks.

There is no subscription charge or joining fee for Interlink, but it does incur normal Telecom Gold time charges, as well as the standard file storage costs. Micronet will also be adding a 1p per minute charge very soon. However, it's still cheaper than the Microlink service which imposes a £3 per month standing charge.

Fun science on C4

Channel 4 has decided that education doesn't have to be boring. A new series has just started, called *Abracadabra*, which is trying to put the fun back into technology and science for children.

Aimed at the 8-14 year-old age group, the programme uses cartoons, music, visual effects and characters like superhero Captain Cactus, schoolgirl Nora Nucleus, Holly Gram and a greedy puppet, Antrilloqus, to introduce children to a variety of complex subjects.



Holly Gram in the new series

The series of half-hour programmes is being screened on Mondays at 5.30pm. It's the result of two years' development by husband and wife team Jan and Michelle Silchenstedt, who worked with teachers, parents and children to produce the final format.



Captain Cactus in action

Abracadabra aims to cover subjects like lasers, genetics, robotics, space travel and geology in its 13 programmes. Each subject is given a broad introduction followed by the history and mythology and explanation of how it works, what's going on now, and how things might develop in the future.

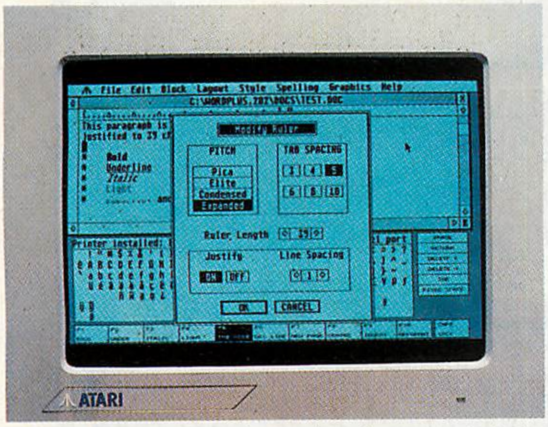
News in brief

■ Improvements have been made to the *Beeb-Planner* program, which uses critical path techniques to plan projects. The extra facilities include using sideways RAM, if present, printer formatting, re-analysis after every change and cost scheduling. The software is available on disc for £39.95 from E J Sheffield.

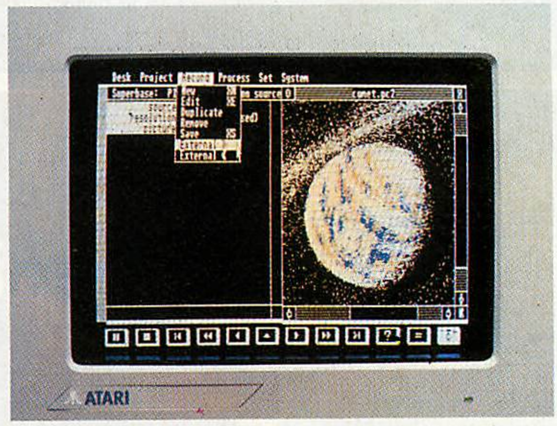
■ A disc drive refurbishment service has been launched by RCS Computer Services in Aldershot. The company aims to help people who need work done on out-of-warranty equipment – something that might well be useful to schools and clubs. The company is particularly strong on BBC micros as it's an Acorn repair agency. RCA is on (0252) 333575.

■ Logo Software is replacing its *Lego Lines* software with *Technical Logo*. This is a language designed for driving Lego Technic models. It comes with programs for a number of models, including the two-motor buggy.

But it's not all fun and games.



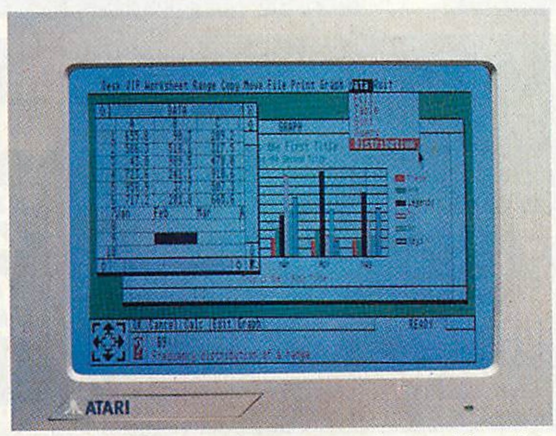
1st Word Plus – G.S.T. Professional word processor featuring U.K. spellings and integration of graphics including 1st Mail for full control of form letters etc.



Superbase Personal – Precision Software. All the features of GEM combined with full relational database power. Easy to set up, flexible, plus unique picture index facility.



Fleet Street Publisher – Mirrorsoft. The complete desk-top publishing package. Gives you page make-up combining text and graphics for sophisticated, professional looking documents.



VIP GEM – Silica Distribution. VIP Professional is an integrated spreadsheet, database, and graphics package. GEM environment plus Lotus 1-2-3 compatibility.

Mixing business with pleasure is no problem with an Atari 520 ST. Not when you've got over 1,000 software titles to choose from.

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ATARI 520 ST

WORKS HARD · PLAYS HARD

*Screenshots are from the original Arcade game.



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So as well as saving you from the enemy, the 520 STM will also save you £184. You'd better hurry though, because it won't be long before our stocks are wiped out.

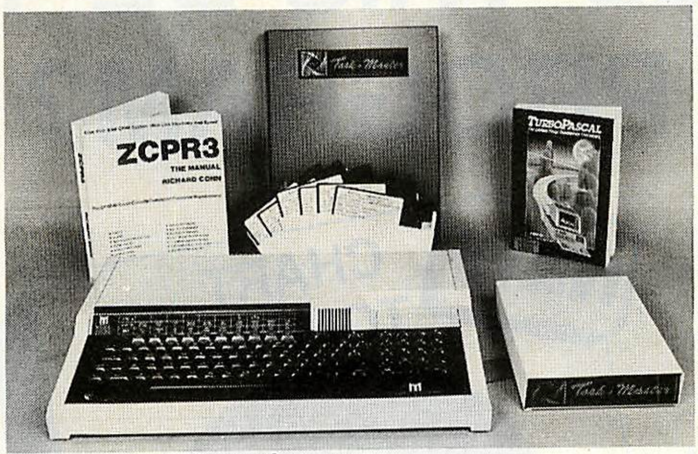
ATARI 520 STM
WORKS HARD · PLAYS HARD

*Offer includes mono monitor. The 520STM plugs into a standard colour T.V.

CONTACTS

Acorn Computers, Cambridge Technopark, 645 Newmarket Road, Cambridge CB5 8PD. Tel: (0223) 214411.
Advanced Computer Products, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ. Tel: (0276) 76545.
Datasolve, Wellington House, 61-73 Staines Road West, Sunbury On Thames, Middlesex TW16 7AL. Tel: (0932) 785566.
E J Sheffield, 8 Langdon Close, Camberley, Surrey GU15 1AQ.
IFEL, 36 Upland Drive, Plymouth PL6 6BD. Tel: (07555) 7286.
Interface Designs, 12 East Meads, Onslow Village, Guidford, Surrey GU2 5SP. Tel: (0483) 32909.
Kref Computer Services, Caerau, Llansadwrn, Menai Bridge, Gwynedd LL59 5SN. Tel: (0248) 810748.
Logo Software, 316a Richmond Road, Twickenham, Middlesex TW1 2PD. Tel: 01-891 0989.
Maze Technology, 11 Braemar Avenue, Neasden, London NW10 0DY.
Micronet, 8 Herbal Hill, London EC1R 5EJ. Tel: 01-278 3143.
Morley Electronics, Unit 3, Maurice Road Industrial Estate, Wallsend NE28 6BY. Tel: 091-262 7507.
Norwich Computer Services, 18 Mile End Road, Norwich NR4 7QY. Tel: (0603) 507057.
Odyssey Software, 8 Greenbrook Avenue, Hadley Wood, Barnet, Herts EN4 0LS.
Photonic Wand Company, 12 Orchard Crost, Guilden Sutton, Chester CH3 7SL. Tel: (0244) 300002.
Rice Computer Electronics, PO Box 2, Morecambe, Lancs LA4 4PP.
Softec, 25 Holmfield Avenue, Bournemouth, BH7 6SF. Tel: (0202)476415.
Tedimen Software, PO Box 23, Southampton SO9 7BD.
Telecom Gold, 60-68 St Thomas Street, London SE1. Tel: 01-103 6777.
Terrell Electronics, 7b Essex Gardens, Hornchurch, Essex RM11 3EH. Tel: (04024) 71426.

Z80 Task-Master



The Task-Master Z80 second processor

The Z80 processor refuses to lie down. A new Z80-based system has just been launched by Kref Computer Services in Wales. Task-Master uses the little-known ZCPR3 operating system, which is compatible with CP/M2.2, but which claims to give advanced features normally only found on large, multi-user systems like Unix.

These features include full support for BBC micro graphics and star commands, automatic recognition of disc formats, and a directory file structure. Over 70 utility programs are supplied on the support disc. Documentation includes a 350-page manual.

The package also includes an assembler, monitor and debugging system and a version of Borland's acclaimed Turbo Pascal software. Task-Master is aimed principally at people wanting to develop their own programs. However, some commercial CP/M packages have been successfully tested on the system — these include *Wordstar 3, Multiplan, SuperCalc 2, dBase II* and *Aztec C.*

Task-Master uses the Tube to connect with the BBC micro. It's compatible with the BBC B, B+ and Master 128. The system comes complete with a fast 64k second processor for £374, or as a software pack for Torch Z80 second processors at £150.

Logo sprites on a budget

A new, low-cost Logo package gives users access to sprites without the expense of a special sprite board.

Parasoft *Logo and Sprites* gives many of the same features as a board, but at a cost of £12. It allows 16 shapes to be present on the screen at one time, and a set of pre-defined shapes is provided including a car, a plane and a rocket, some ghosts and even *Pacman.* Special commands allow these sprites to be easily edited into new shapes, which can be saved.

The program adds 18 new commands to the Logo system.

Each sprite can be moved around the screen at a set speed or it can be animated. Sprite colours can be changed and so can the background. Normal turtle graphics or the Stamp command can be used to draw in backgrounds.

Complete animated scenes can be created. Children can create games as there are commands to detect two sprites touching or colliding.

Parasoft *Logo and Sprites* was written by a 12 year-old pupil and is available from Marlborough First and Middle School, Marlborough Hill, Harrow, Middlesex HA1 1UJ.

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OFFICE USE ONLY Date in:
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Software houses show new RISC packages

It looks like it's going to be an even busier show than we thought! Many companies will be demonstrating software and hardware for the forthcoming Acorn RISC machine.

Electro Music Research is working in conjunction with Acorn to develop a complete *MIDI* software and designing a *MIDI* interface.

EMR has written a wide range of *MIDI* software, and its products are used in a large number of schools for teaching music at O and A-level. Products include performers, sequencers, samplers and, according to the company, 'the most advanced score writing program for a home micro'. This gives an on-screen display of the music in proper musical notation with all note lengths, chords, time signatures, accidentals and so on. It will also produce a hard copy of your music in either a full orchestral form or just as a piano arrangement.

The Performer allows you to 'record' in real time or step through your recording and edit it note by note. You can then add up to 63 other instruments and play the whole lot back. All of EMR's RISC *MIDI* equipment will be sold under the Acornsoft name.

EMR will also be developing software for the internal sound chip in the RISC machine which is very similar to the Music 500. At the show, EMR will be running a continuous live demo of the latest in electronic music and *MIDI* – all run from a couple of BBC micros. The company will also be offering a *MIDI* interface for the BBC for £80 and will throw in *The Performer* free.

Computer Concepts will also be demonstrating some RISC utilities alongside a book on Acorn RISC Machine (ARM) assembly language by Peter Cockerell. And Minerva's RISC database (announced last month) will be on display.

Sideset on show

Maze Technology hopes to have its *Sideset* utility (see page seven) at the show. But the software is already undergoing some upgrades – even before it's launched.

As a result of feedback from Maze's early publicity, the software is being modified so that it works with even more applications packages. Although *Sideset* works with all 'legal' software, a large proportion of potential customers also want it to work with unconventional packages like *InterWord*, according to company director Owen Cullum.

The company is also looking at making the software work with co-processors. By enabling users to switch between programs running in the main and second processors, it may be possible to achieve a crude kind of multi-tasking.

Delta database display designer

Minerva Systems will be showing the latest utility for the *System Delta* database package – a programmable graphics manager called *System Gamma*. This is similar to *ViewPlot* and *InterChart* in that it allows you to produce graphics from the figures in your database. Unlike the other packages, however, *System Gamma* lets you draw the graphs using very simple star commands.

Other *System Delta* products on show will include the new *Reporter* package. This is used to extract information from your database files using special formats. A wide variety of user-defined formats are possible, and the information can be printed or written to a file.

Another package, *Inter/View Link* is designed to allow existing data from Computer Concepts' *Inter* suite of programs and Acornsoft's *View* packages to be read into a *System Delta* database.

Bond bytes back



Does the cello feature in the computer game?

If all goes according to plan, James Bond should be putting in an appearance at the show. Not James Bond himself, you understand – he's far too busy fighting international subversion and charming beautiful women in far-off places.

This particular 007 is the latest computer game spin-off from Domark. Based on the new Bond film, *The Living Daylights* starring Timothy Dalton, the game promises 10 levels, each showing a different scene from the movie. The locations range as far and wide as Vienna, Tangiers and Rechen Am See, which apparently is in Italy.

The game should be available from normal software retailers. It's expected that cassette versions will sell for £9.99.

News in brief

■ Final production versions of *Genie* – the pop-up desktop utilities by Permanent Memory Systems – are now ready, and PMS hopes to have them at the show. The £60 package provides features like a notepad, address book and desk diary in a battery-backed module. The utilities can be called from within any other package, and work even with second processors and other pop-up programs, like *Spell Master*.

■ Beebug will be concentrating on its Master ROM. The control panel features a *Gem*-like disc menu, an actual 'control panel' for editing the CMOS RAM and a diary/calendar similar to PMS's *Genie*. The company will also be showing its new *Command* communications program.

■ Twillstar will have on sale the latest Teco printer. Retailing at £229, it features full Epson and IBM compatability with a draft speed of 180 cps and NLQ at 39 cps.

XOR
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NEW
FROM LOGOTRON

The Challenge of the Order of

XOR

XOR Designer holds the secret of XOR, the maze game which bends your mind with its labyrinthine puzzles.

YOU can acquire *the secrets of the labyrinth*!
YOU can take on the *mysterious mantle* of XOR!
YOU can *become* a Master of the Maze!

XOR Designer enables you to enter into the World of the Labyrinth - as Master of the Maze! You will acquire the power and shadowy stealth to create pitfalls and puzzles worthy of The Maze!

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XOR Designer features:

The *Maze Designer* - a screen showing the whole maze, with an easy system for selecting and placing icons. You can edit existing mazes or start from scratch - even lock mazes to deter the inquisitive gaze of the uninitiated!

The *Icon Designer* - deepen the mystery of any maze by changing the Faces of XOR - edit the existing icon set, or completely redesign your own. We supply you with the original XOR icon set *plus* another completely new set.

The *Game Player* - load a maze from disk, choose an icon set, and your labyrinth is ready to confront any challenger! The Game Player includes facilities for screendumps and saving solutions to disk. We supply levels 4 and 5 of the original XOR, and the saved solution to level 5!

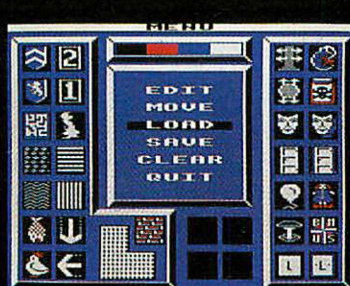
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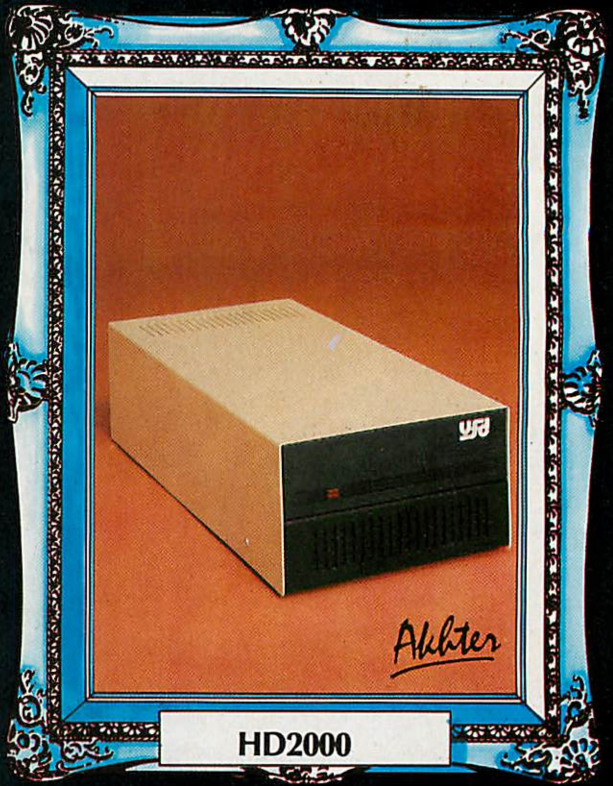


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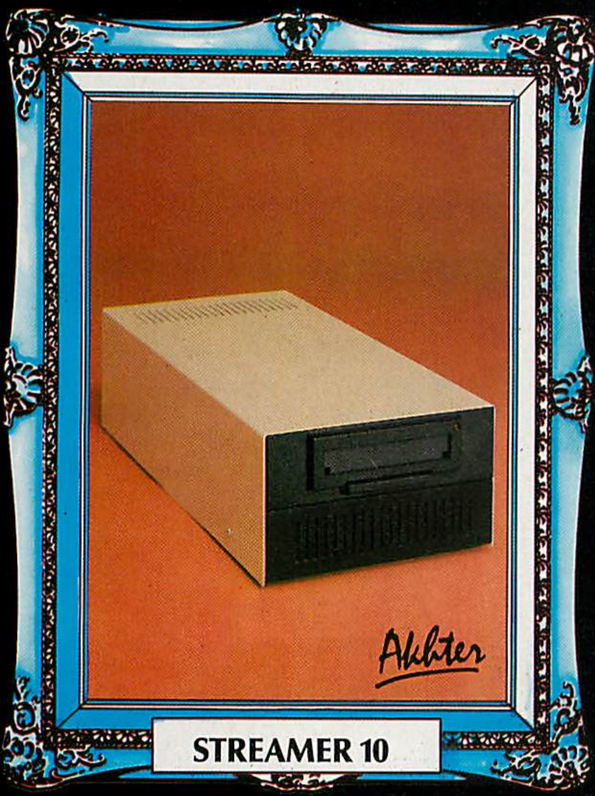
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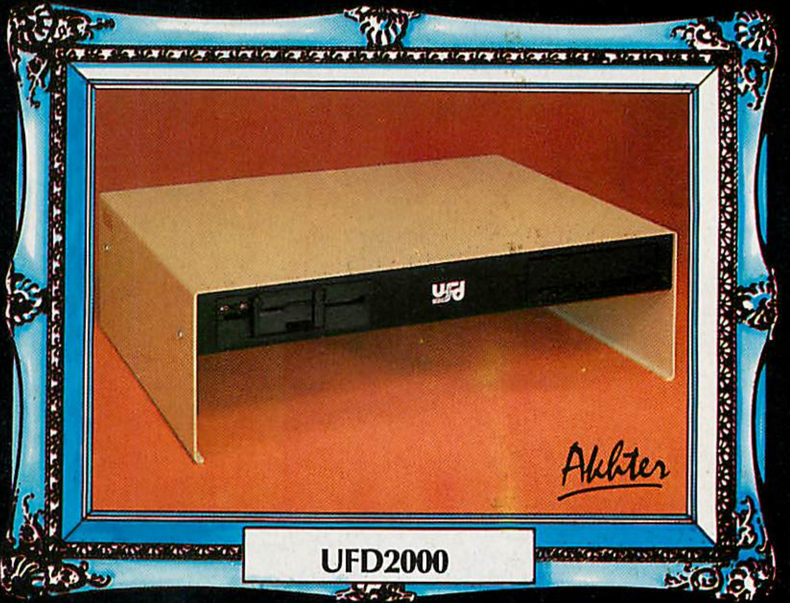
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MODEL	DESCRIPTION	PRICE
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NUCLEUS 20	20MB + 10MB STREAMER + 1MB FLOPPY*	£1599.95
NUCLEUS 40	40MB + 10MB STREAMER + 1MB FLOPPY*	£1995.95
UFD 2000	20MB + 1MB FLOPPY*	£1995.95
HFD 2000	20MB + 10MB STREAMER*	£1495.95

*These units are mounted in a plynth suitable for the Acorn Master 128 Series and includes Power supply units.

All prices include V.A.T.

UFD USER FRIENDLY

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Picture shows 20 and 28 megabyte units. 40 and 56 megabyte units may be slightly taller in size.

Plug in 20 to 112 MBytes of extra storage with the Viglen Winchester System

If you want to increase your storage capacity up to an incredible 112 MBytes you need a Winchester; but not just any Winchester ... the new Viglen System is 100% compatible with the Acorn Winchester, it's simplicity itself to install and it costs a lot less than you think.

The Viglen Winchester is ready to plug straight into your BBC Master or if you have a B or B plus you will simply have to fit an ADFS ROM. You can use up to two floppy disk drives in conjunction with the unit and, fitted to the B+ or Master, the floppies can double their capacity by running in double density mode.

The 112 MBytes Viglen Winchester System is equivalent in capacity to over 1000 100K floppies or 250 400K floppy disks. It takes under 2.5 seconds to save 200K bytes, making it at least ten times faster than the equivalent floppy disk options. The system is designed for virtually every application from education or business to home use.

	PRICE INC V.A.T.
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VB120 20 M Drive 1 Winchester	549.95
VB128 28M Drive 1 Winchester	599.95
VB140 40M Drive 1 Winchester	819.95
VB156 56M Drive 1 Winchester	899.95
Acorn ADFS Rom with utilities (essential for BBC B and B Plus)	29.95
Acorn 1770 upgrade kit (BBC B)	49.95

WHAT DO I GET FOR MY MONEY

1. Winchester Unit – (winchester drive, controller boards, power supply and fan all fitted in one compact case). The fan is recommended in order to keep the winchester at the correct operating temperature.

2. Master Reference manual part 1 (for a BBC B or B plus you will require the Acorn ADFS Rom and utilities available at an extra cost).

3. Winchester user guide.

4. Additional utilities on the winchester including formatter, verifier, ADFS menu and backup program.

COMPATIBILITY?

Viglen winchesters are 100% compatible with the Acorn winchesters and the ADFS. Any program that will run on the Acorn winchester will also run on the Viglen winchester. The winchesters also run with the Acorn Master 512 board with DOS plus (CPM86 and MSDOS compatible operating system).

PLUG IN SECOND DRIVE

The Acorn ADFS can handle up to two winchester drives. These are accessed as drive 0 and 1 (the floppy disk drives being accessed as drives 4 and 5). Viglen winchesters are supplied as Drive 0 (single unit) and Drive 1 (Second drive for single unit). The Viglen drive 1 can be instantly plugged into drive 0 and used either as a backup for Drive 0 (and perhaps taken off and stored away) or for more online mass storage. This will enable you to back up 20 Megabytes in under 7 minutes.

BACK OF UNIT



1 MHz IN: This socket is used to connect the micro to the winchester.
1 MHz OUT: This socket is used to connect any other device that is normally plugged into the 1 MHz bus on the micro.
DRIVE 1 DATA: This is a 20 way socket which is used to connect the data signals to a second winchester drive.
DRIVE 1 CONTROL: This is a 34 way socket which is used to connect the control signals to a second winchester drive.

STORAGE OPTIONS:-

Drive 0	Drive 1	Total Capacity
20 Meg	20 or 40 Meg	40 or 60 Meg
28 Meg	28 or 56 Meg	56 or 84 Meg
40 Meg	20 or 40 Meg	60 or 80 Meg
56 Meg	28 or 56 Meg	84 or 112 Meg

HOW TO ORDER

Simply write off today to Viglen and remember to add £8.00 carriage, packing and insurance, and allow 7 days for delivery. Credit card holders may order by telephone. If you'd like to find out more why not come down to our West London showroom (see map for directions) or if you can't make it simply ask for our special datasheet.

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Orders from Educational Establishments, Government Departments and Plc Companies accepted. Education discounts available, please call.

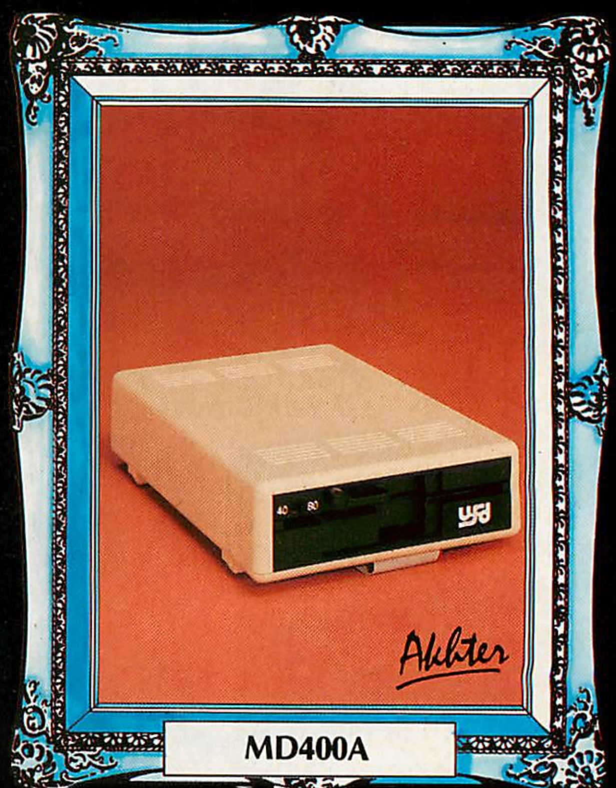
Unit 7, Trumpers Way, Hanwell, London W7 2QA. Sales Hotline 01 843 9903.

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for the BBC &...



MD802DM

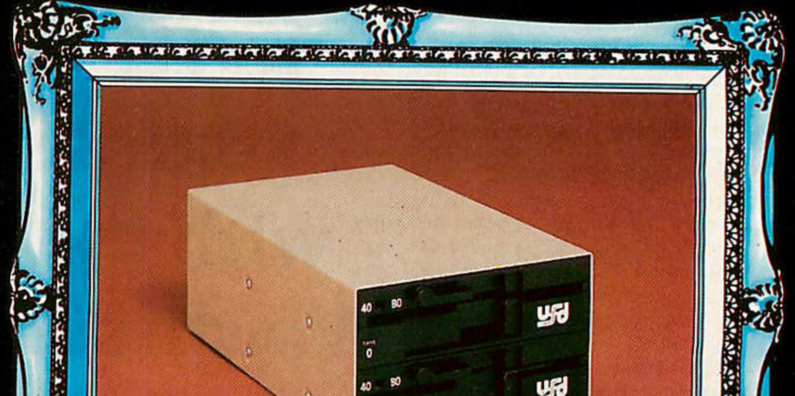


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SINGLE & DUAL DISK DRIVES



MD802E



MD802C

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MD400A	400K Drive. Double Sided with 40/80 track switch	£139.95
MD400B	400K Drive. Double Sided with 40/80 track switch+P.S.U.	£154.95
MD802C	Dual 800K drive with 40/80 track switch	£269.95
MD802E	Dual 800K drive, double sided, with 40/80 track switches and P.S.U.	£299.95
MD802DM	Dual 800K drive, double sided, with 40/80 track, P.S.U. mounted in plynth.	£324.95
All 5¼" Drives have 40/80 track switch mounted in front plate of disk drive.		

All prices include V.A.T.

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All Compacts with Package Offers of Software etc. a value of £35 to £50 software etc. to your choice.

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Compact TV Modulater	£26.00 (e)
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Juki 5510 Colour Upgrade Kit	£94.00 (c)
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New Citizen Laser Overture 110 10 pages/min 250 Sheet cassette dual interface.	**£1650.00 (a)**

All printers include Free BBC cable or plus £5.00 for IBM lead.

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NB It is essential to state machine and 40/80T when ordering software

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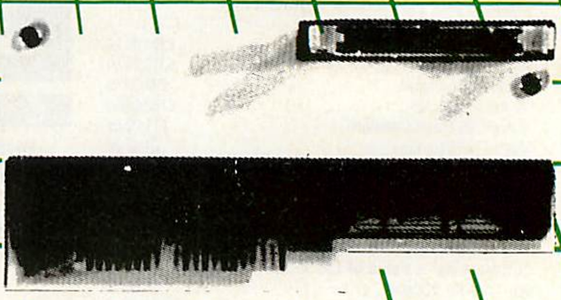
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- Achieve greater BBC compatibilty

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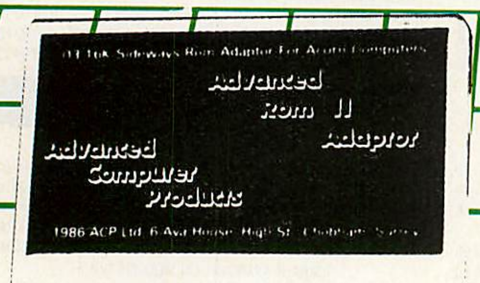
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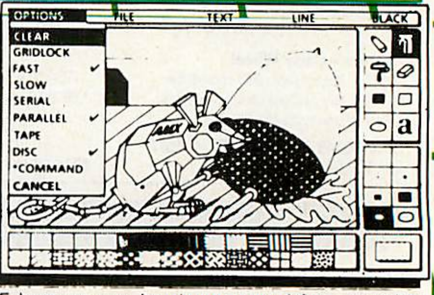
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£69.95 – MOUSE PACKAGE AND AP5 £125.00

Advanced Computer Products Ltd., 6 Ava House, High Street, Chobham, Surrey. GU24 8LZ Tel: 0276 76545

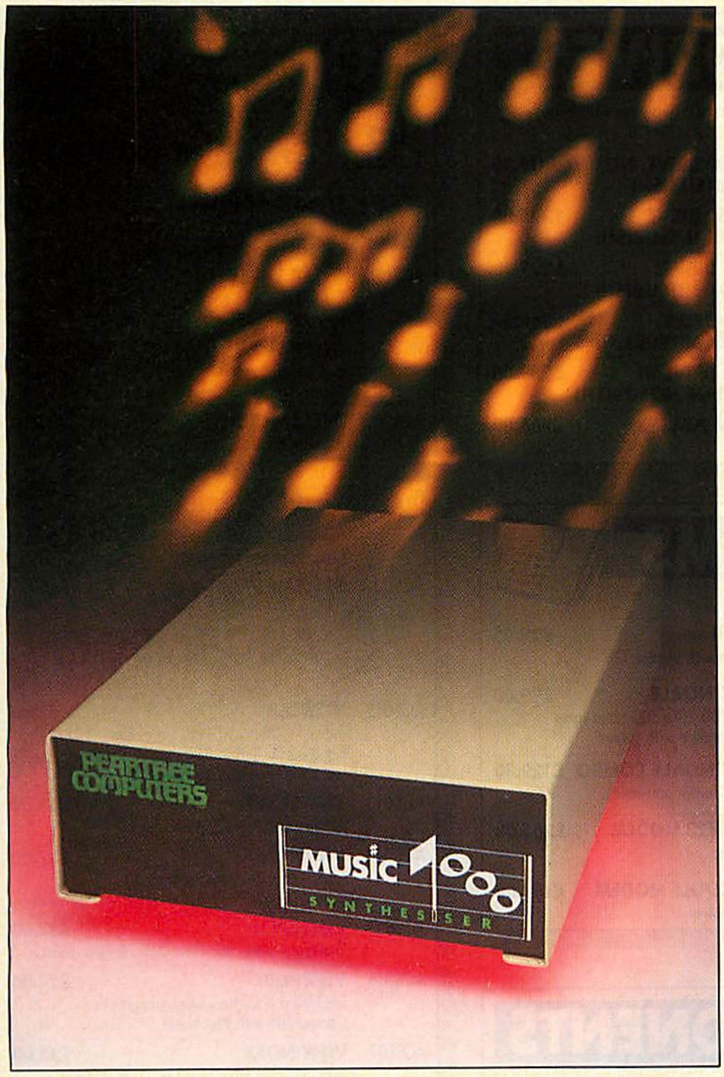
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- ✗ no music print out was available
- ✗ only a few bars were visible at any one time
- ✗ the option to design your own waveform was not available
- ✗ it was expensive for what it offered

Now, the new generation is here:

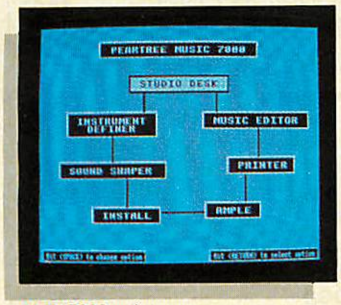
The Music 7000 solves all the old problems and has these new outstanding features:

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- ✓ **Easily affordable**
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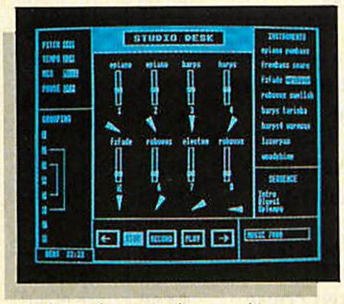
MUSIC 7000 SYNTHESISER

Hardware & Software complete at only

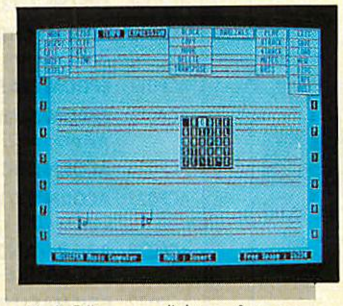
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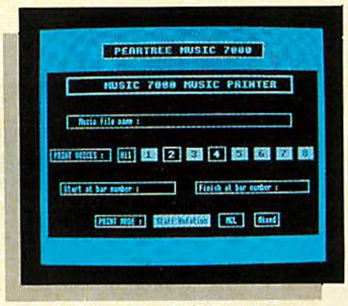
Music 7000 main menu



Studio Desk menu with mouse driven record, play, rewind options



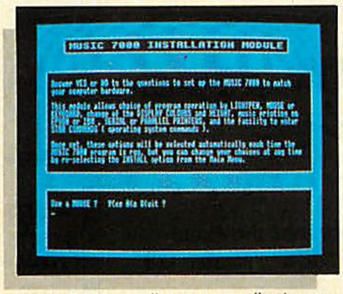
Music Editor menu, light pen & mouse driven with complete menu options at top



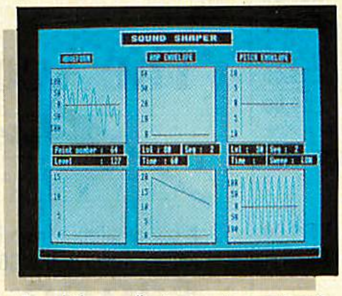
Music Printer menu with many unique features



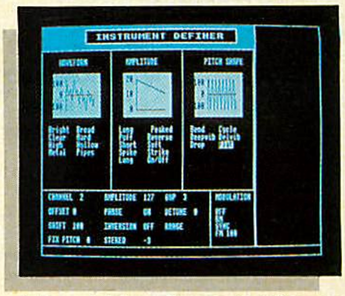
Music 7000 Ample menu



Music 7000 Installation menu allowing you to install your mouse, keyboard, light pen, printer type, colours, etc.



Sound Shaper allowing you to create your own waveforms, envelopes, mouse, lightpen or keyboard driven



Instrument definer allows you to define your own instrument pitch, amplitude and wave forms

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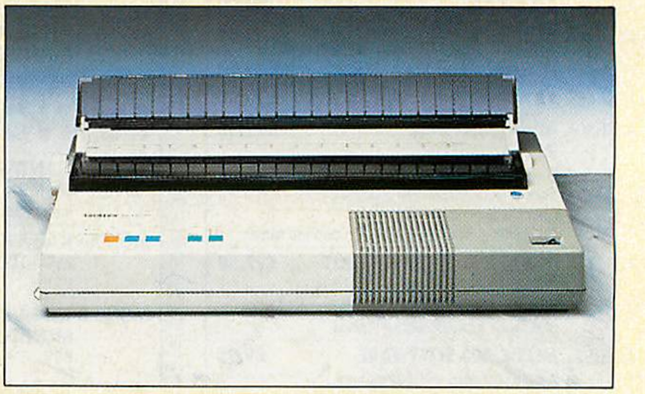
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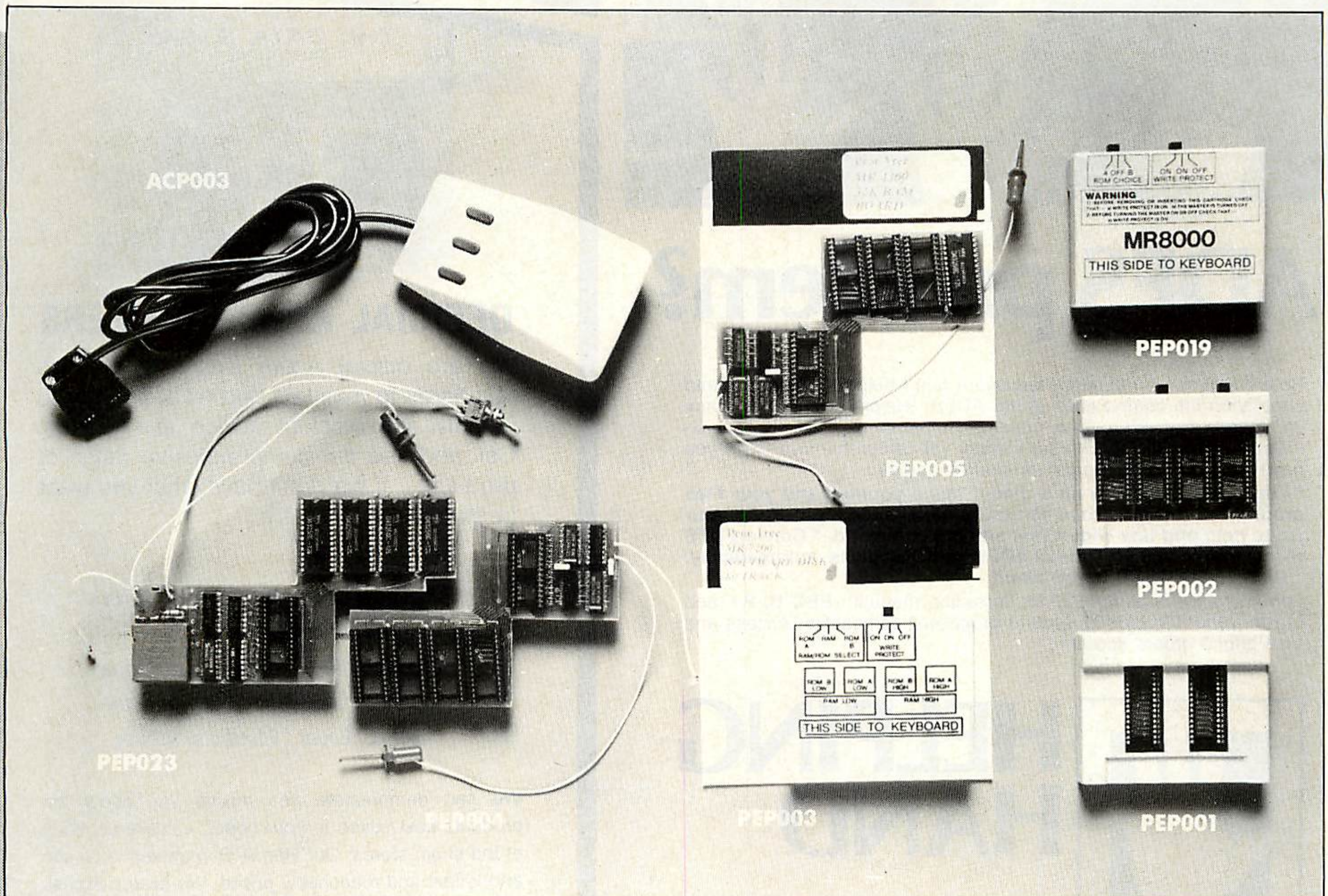
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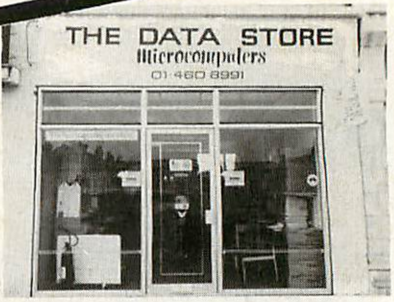
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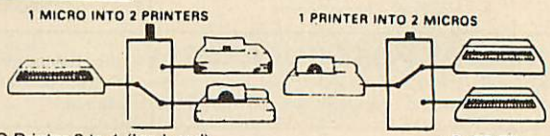
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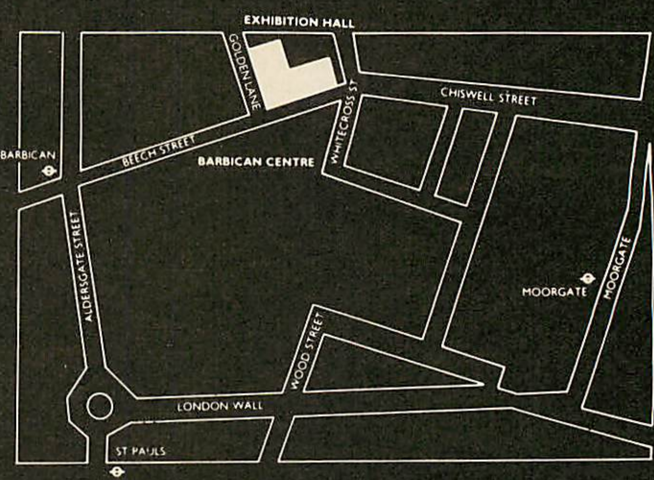
The 1987 ACORN USER Exhibition is the premier show in the UK devoted to all aspects of buying, using and getting the most out of your BBC computer. You will have the unique opportunity of being able to review the latest hardware and software innovations whether you are an educational, business or home-user.

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Subjects to be covered will include: Education software, business software, programming, monitors, printers, peripherals, music, publishing and graphics.

Buy your tickets in advance and save yourself time and money!

Before July 9th, advance tickets will be available at the specially reduced price of £2.00. We shall be welcoming all those employed in education free of charge on the opening day, Thursday 23rd July 1987. In addition to the free day, educationalists will be eligible for half price tickets – £1.50 – for the Public days on the 24th through to the 26th. These tickets are available on the door or in advance by using the coupon below. Seminar tickets are £3.00.



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AU2

LETTERS

Write to Letters, Acorn User, 141-143 Drury Lane, London WC2B 5TF

UPGRADE SAGA

Sir, Further to your article in the April *AU* about ROM/RAM board compatibility, perhaps my experiences might be of interest to your readers. I own a BBC B with Watford DDFS, and some months ago decided to add ROM and RAM upgrades. My first choice was the Solidisk Fourmeg board. Before ordering it, I sought and received an assurance from Solidisk's technical people that it was compatible with my DDFS. Imagine my surprise, therefore, when the board arrived and wouldn't even physically *fit* in the Beeb as long as the DDFS board was present! Eventually I raised the board up in its socket, using a couple of 40-pin IC sockets: now the Beeb's lid wouldn't close, but at least I could try out the board. Conclusion: it didn't work. Virtually every command caused the machine to hang. The supplied software (£10 extra) came with no documentation whatsoever, and when one of the programs crashed with a syntax error, I gave up. Perhaps it was a dud board, or perhaps it just didn't work with the DDFS. Either way, I was rather underwhelmed and returned the board immediately for a refund. It took almost four months of phone calls – and eventually a threat of legal action – before the refund came through. No marks to Solidisk.

Now to chapter two of the saga. I ordered a Watford ROM board and 32k shadow RAM card. At least these were advertised as compatible with the DDFS. The ROM board worked fine, but there were problems with the RAM card: its controlling ROM included a *RAMTEST command to test the card's memory, and this indicated an intermittent failure, seemingly at the very beginning of the test routine, which only seemed to occur about half the time, and was also noticeable via screen glitches, lost data, etc. I rang Watford and was told, 'Probably you need to replace your SY6502 CPU with a Rockwell R6502A; if that doesn't work, send the board back and we'll check it.' It turned out that my Beeb already had an R6502A, so back went the board whence it came. A replacement arrived a few days later, with a note saying that no fault could be found in the original. I plugged in the new one and found exactly the same fault. Faced with the prospect of a machine fault, I tried one last thing. The instructions for the RAM card had said that the DFS ROM should be fitted in the lowest priority socket (0), and the shadow RAM's controlling ROM in the next lowest socket (1): after the fitting of the ROM board, these corresponded to the two leftmost sockets on the BBC's main board. I decided to see whether moving the shadow RAM's ROM onto the ROM board would help at all; I moved it to the lowest-priority socket on the ROM board (5), and lo and behold! the memory problem vanished immediately and hasn't recurred. I don't know why this should be so, but it certainly does solve the problem: my system works perfectly now, and I find it very satisfactory.

Maybe this information would be of assistance to any of your readers who find themselves in a similar situation.

Patrick Edmond
Ireland

GETTING PSYCHEBROT

Sir, In Return of the Mandelbrots, in May's *Acorn User*, you published a series of views from the *Psychebrot* program. I am delighted with the response from your readers, but unfortunately I have had quite a few requests for free copies from people who expect me to guess their disc format, and to supply a free disc and postage as well! May I explain how readers should apply for their free copy of the program.

The original *Psychebrot* package ran non-stop at last year's Computer Images exhibition at Brunel University, showing about 120 different views of the Mandelbrot set. The current complete package involves a tour of 130 views, and is only available on ADFS 80-track double sided disc (which is nearly full).

For those who cannot read this format, a special selection has been shoehorned onto single density DFS formatted discs, ranging from 16 views on a 40-track single sided disc up to 59 views on an 80-track double sided disc.

To get a copy, readers should send a ready-formatted 5.25-inch disc, and sufficient stamps to cover the return postage (or £2 to cover the cost of a blank disc, postage and packing) to:

Psychebrot,
CODIL Language Systems,
33 Buckingham Road,
Tring,
HP23 4HG.

While the software is free, *Psychebrot* viewers are invited to make a donation to the mental health charity, MIND, 22 Harley Street, London WC1N 2ED. Readers are encouraged to give away free unmodified copies of the disc, as this can only increase the total contributions made to MIND, while lightening my postbag!

Chris Reynolds
CODIL Language Systems

MORE MAGIC

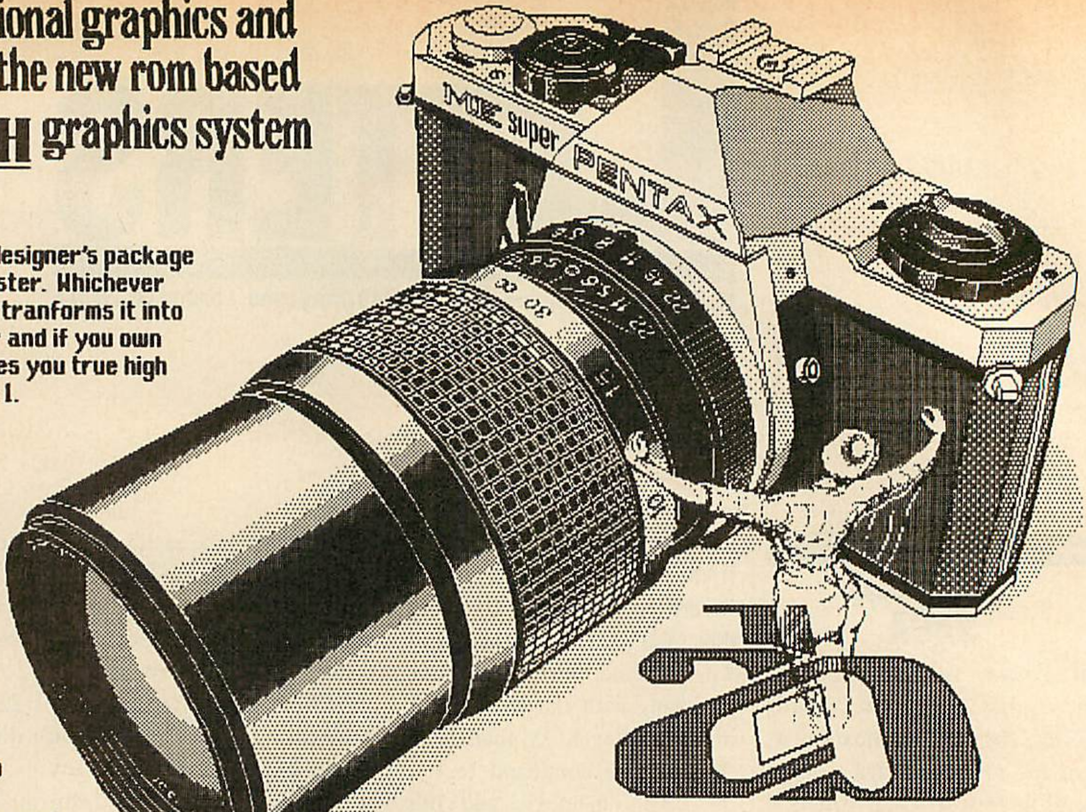
Sir, I'm sure there are many others besides myself who have completed all nine screens of Acornsoft's excellent *Magic Mushrooms* and would enjoy the extra 45 I have devised myself (for the Electron only).

A lot of time and effort has gone into these and they are more challenging and varied than the original ones.

If anyone is interested in my screens please send an sae for further details.

Alan Davison
32c Imperial Drive
Airdrie
Scotland
ML6 9EQ

If you want professional graphics and text then you need the new rom based MICROBRUSH graphics system



Microbrush is a professional designer's package for either the BBC B or the Master. Whichever machine you have Microbrush tranforms it into a powerful graphics computer and if you own a Master then Microbrush gives you true high resolution in mode 0 and mode 1.

Mode 0 - 1216 * 416
Mode 1 - 608 * 416

This whole A4 page was composed as one mode 0 high resolution image. using the out-board scroll system, and has a resolution of 1216 * 900 pixels.

Microbrush for the BBC B is comprised of two 16K roms. The Master version contains a third rom. The first two roms can be used in either machine.

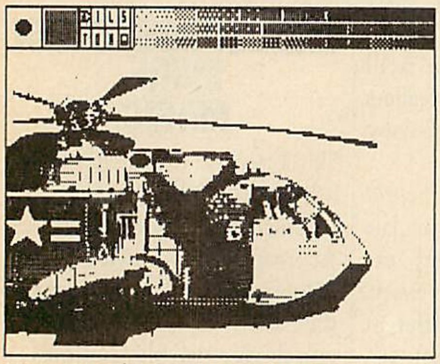
The whole system is menu driven and controlled by the Marconi RB2 tracker ball for speed and precision, but may also be used with either the AMX or the Whigmore mouse. Please note that the tracker ball is not included.

Microbrush A - £150 2, 16K roms + disc utilities, BBC B and Master
Microbrush B - £200 3, 16K roms + disc utilities, Master only.

When ordering please remember to state which system you require, whether you need 40 or 80 track discs and a telephone no. if you have one. Orders and information requests should be sent to-AB Designs, 81 Sutton Common Road, Sutton, Surrey. Phone 01 644 6643

The Paint Box system

The paint box system operates in both mode 1 and mode 0 offering a palette of either 42 colours or grey tones. Microbrush also lets you build your own palettes. Using these colours you can draw lines, sketch, fill, paint in foreground, background, opaque, transparent and combined colour. Add this to a colour rubber which will selectively erase any actual colour and you have a very powerful paint box system with more than **1,000,000** possible colours.



Above the paint-box system in mode 0.

The Ikon Generator

The ikon generator is the main workhorse of the Microbrush system as it is used for both generating and positioning any ikon up to 6 * 3 character blocks. This system is also used by the typesetter and for creating colour palettes, rubbers, paint-brushes and type-faces. Up to 46 ikons can be stored in memory. The scope of the ikon facility is immense as it allows you to transform the Microbrush system into a purpose built design tool that suits your needs.

The Type Setter

With the Microbrush system you will receive 50 proportionally spaced typefaces. The smallest allows you up to 170 characters to the line and if this is not enough then you can design your own typefaces.

The typesetter displays the current font as a scrollable menu allowing you to quickly produce professional typography.

The Screen Editor and the Special Effects Generator

The screen editor is a powerful drag system that allows you to store up to a quarter of the screen in memory. Once stored, images can literally be dragged across the screen, repeated, copied, saved to disc or fed to the special effects generator.

The Special Effects Generator

This is a very versatile system which will automatically outline, inline, shadow, 3^D, half-tone, etc. any image held within the screen editor's memory.

The Injector rom

The Injector rom is the second rom in the Microbrush system. This rom contains the drawing functions such as lines, rectangles, circles, ellipses, arcs, rotate, squash, stretch, zoom, halve and quarter screens, plus a whole host of other functions.

This is a brief description of the two rom system for the BBC B or the Master. Also supplied are an Epson FX80 screen dump and a 7 * 7 character pixel editor. These two roms offer you tremendous potential for producing professional text and graphics.

The Master rom

The Master rom takes you into a completely different world of graphics with almost 4 times the resolution in modes 1 and 0, plus 2 on-board graphics screens, 10 rom based typefaces and a 3^D generator which is linked to a 10 point perspective system. This allows you to deal with exceptionally complex perspective tasks such as the camera seen above. The Master rom also comes with an out-board scroll system which allows you to build images with a resolution greater than 1216 * 2000, plus there are high res. screen dumps for both Epson and Integrex printers.

Lastly flick through the pages of this magazine and see how many of the other graphic systems are capable of producing their own advertising.

As this advert was produced using the Microbrush system you will be able to assess for yourselves its capabilities in two colours using an out-board resolution of 1216 * 900. What you probably have not yet seen is what the system can produce in the four colour mode with an out-board resolution of 608 * 900. The results are startling. When printing mode 1 high resolution images up to 16 different colours can be included in one image. This versatility plus the extensive graphics and text capabilities make Microbrush ideal for so many areas of design that the list is endless:- Publishing, packaging, sketching, painting, book illustration, P.C.B designs, interior design, perspective drawing, designing forms, labels, diagrams, reports, pamphlets, mechanical drawings, architectural drawings, advertising, industrial and comercial design, in fact any situation that requires exceptional graphics routines, high resolution, and a wide range of type faces in different weights and sizes. Please include £2 for postage and packing when ordering.

Extentions to the Microbrush system include - The out-board scroll system - £40, an extended Master rom offering you 14 colours in mode 1 and 4 colours in mode 0 - £85, a typeface editor plus fifteen extra typefaces - £25, the Master rom - £65. No VAT if purchased before September 1.

SPRITELY COLOURS

Sir, I was wondering if by using the BBC computer's character definition system you could define, say, a red box shape and then define a blue line and put them together to make a sprite. Using this it would be simple to add full colour sprites to your own Basic programs. Also, could you recommend a sprite designer that can handle around 20, 24 x 24 colour sprites.

Also, can *GXR* ROM sprites be used on another BBC micro without a *GXR* fitted?

Imran Ali
Bradford

First, *GXR* sprites can only be used if the *GXR* ROM is present in the machine (or the *SPRITER* ROM image from the Compact Welcome disc).

***Acorn User* carried two articles by Harry Sinclair on sprites, in September and October 1984, explaining how to create and invent your own sprites. See the form on page 129 for details of back issues.**

MANDLEBROT QUERIES

Sir, Re: the update of the Mandelbrot article in your May issue (page 81), may I say that I have enjoyed running the fractal programs for many hours since they appeared last May and July, and I look forward to experimenting with the new parameters. There are a couple of points on which I am not clear, and I hope they will be of sufficient general interest to those with a BBC 32k to warrant a reply.

1) The screen colours after saving to disc using the recommended *SAVE and *LOAD instructions are different from those obtained when the programme is run, and I have found no way of changing the saved screen from red, yellow, green and black. Is there any way of reproducing the original colours after saving to disc? This is important for anyone wishing to obtain colour prints from the screen.

2) In the fifth roots program in the May yellow pages, as last July, line 240 gives a DEF PROCplus, but I can find no call for a PROCplus in either program. Is this an error or is there a reason for its inclusion?

A S Fern
Rochdale

The Mandelbrot article programs contain MODE and VDU19 commands to select the screen mode and colours. Type these into your micro before *LOADing the saved screen. PROCplus was left in by accident; taking it out won't affect the programs.

TURNING THE PAGE

Sir, I heartily endorse Maurice Gordon-Edgley's comments in April's issue. *View*'s lack of a page-end indicator in writing and edit modes is infuriating, and Acornsoft are polite but unhelpful on the subject.

I edit long texts, say 150 kilobytes covering 100 A4 pages when printed out. Adjusting a single page-length can take 20 minutes or more, supposing one gets it right first time. This is the time required to FINISH an EDIT, SCREEN the file to note that space left for a diagram is not split between two pages, or a section heading does not appear at the bottom of a page, and correct it by re-editing the whole file, then re-screening it to check. This, repeated say 30 times for such a text, takes hours. This is an irritating fault in an otherwise excellent WP program.

J.W. Swift
Sussex

Perhaps the best way to get over this is to split the text into several 'Chapter' files, each starting on a new page. Each chapter file can then be edited separately – but when you want to print them all together, PRINT file1 file2 file3 return will ensure the page numbering runs consecutively and should alleviate this annoying problem.

MORE FOR COMPACTS

Sir, Can you please tell me why you plan programs for the BBC Compact, but when I try to buy them from your mail order section they are only made in 5.25-inch disc and not 3.5-inch Compact size. I have tried to download your programs from Micronet but they can only be down loaded with a DFS System and not with an ADFS System. I find it very discouraging to have to keep typing in programs for the Compact that should be made available on 3.5-inch disc.

Can you please tell me when I can obtain 3.5-inch discs of your programs.

J Maloney
Swindon

The *Gallery* and *Gallery Collection* discs were released in 3.5-inch format in March's issue to test demand for the Compact format. If we get the requests, then the monthly discs will go into Compact format. You should have a copy of the Acorn 1770 DFS on your Compact Welcome disc. With this loaded into Sideways RAM you shouldn't have any problems downloading, onto a DFS-formatted 3.5-inch disc. If you don't have DFS on your Welcome disc, contact Acorn who can provide one.

OPENING THE WINDOW

Sir, In the April 1987 issue you published an article On the Side to enable your readers to print extra wide spreadsheets.

Having typed in the listing, I am unable to use it as I have no way of learning how to set a print window to cover the whole sheet (what ever that means!). Presumably I am not the only one of your readers would have liked to try out the program using the sample file supplied on the Master's Welcome disc. Since July 1984 you have printed many hints on the use of *Wordwise* and *View* wordprocessors.

May we hope for something similar for *ViewSheet* in view of Acorn's unhelpful attitude towards their customers?

E Russell
Surrey

To set a printer window in *ViewSheet*, load the sheet as normal, and press Escape. You will see your spreadsheet. Now press f1, and the prompt 'Window' will be shown at the top of the screen. Then enter PO and Return.

The printer window definition is shown, and should be changed by typing in the new definition, in the same way as a normal window definition. TopL and BotR refer to the corners of the area to be printed, Cw is the width of each cell of the spreadsheet. Once the definition looks right, press Return. Go back to command mode and enter SCREEN. This shows what the printer would output if you typed PRINT.

AUDIOPHILE ACORN

Sir, Those readers who own Master Compact monochrome or colour systems may be interested in a modification that I have done to mine to take advantage of the superior sound quality that is available from the audio amplifier and loudspeaker inside the monitor.

I have fitted a phono socket to the rear left-hand side of my keyboard and transferred the wires that were connected to the speaker to this socket. This new 'audio output' can then be connected to the audio input of the monitor to give better quality sound whose level can be controlled with the monitor volume control.

The important thing to remember is that the rearmost of the wires from the two-pin connector on the Compact keyboard board MUST go to the centre pin of the phono socket. The other wire goes to the phono outer.

A Barkley
Evesham

DELETING DIFFICULTIES

Sir, One annoying feature of *Wordwise +* is that there is no easy way of deleting text from the main text area or from one of the segments. One way of getting round this is to use the markers and f7, another is to use a DIY marker and f6. Both involve several presses of the keyboard which make them too much like hard work for someone as lethargic as myself.

My solution, therefore, is to program one of the red function keys to perform this manouevre in one go. The first definition in the next column shows you how this can be done very easily.

The second will delete from the current cursor position to the end of the text or segment area – a useful facility if you tend to do a lot of drafting.

```
REM Clears the Text or
Segment Area
*KEY0 |!|N|!#|!|O|!#|!'

REM Deletes from Cursor
Position to End
*KEY1 |!#|!|N|!#|!'
```

James Ducat
Bath

A PROGRAM OF MUSIC

Sir, Congratulations on your Music Special (April issue). I hope it will be the first of many music editions, and that you will be encouraged to produce both special issues on other topics and programs in languages other than Basic, following your Ample precedent. *Theme* deserves to be an even greater success than *Tunemaker* – a truly excellent program.

That is the nice bit, but I do have one grouse. I am expert at neither programming nor music, but am the proud owner of a Master 128 and Music 5000, bought to help my children and me learn something about both in a constructive and enjoyable way. I was really looking forward to your promised program in Ample as part of the process.

Imagine the disappointment, then, when I failed to enter the program, for which there were virtually no loading instructions. After one passing reference to the Music 5000, the article with the program concentrated exclusively on the Music 500, which on the software side seems quite a different beast.

All I managed was to enter some of the simple riff words. In all other program words there seem to be system words or symbols which are rejected by the Music 5000. And I cannot find a way to enter program lines with line numbers at all. So to avoid disillusion taking over, could Bob Cornford-Wood be persuaded to write an idiot's guide in your pages on how to get his masterpiece working on a Music 5000?

A D I Reed
Croydon

As Bob stated in his article, the *Sunrise-Sunset* Ample program was designed to run on a Music 500. The Music 5000 has a musical stave editor more like the *Theme* program.

FINDING GENLOCK

Sir, with reference to page 21 of the March issue of *Acorn User*'s letters section, BBC on TV, I would like to know the names and addresses of the companies which can supply me with a Genlock Board to superimpose BBC computer graphics onto a video picture.

Gary A Kewley
Isle of Man

Genlock boards are available from:
Abbey Audio Ltd, Unit 8,
Littleton House,
Ashford Road,
Ashford, Middlesex
TW15 1UU
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Tel: 0942 882332
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Liss Mill, Mill Road
Liss, Hants GU33 7BD
Tel: 0730 893444

RECOVERING DISCS

Sir, Re, Rescued Disc Files (March '87). I would like to offer some advice of my own on recovering discs with corrupted catalogues.

This experience was gained while nursing my now departed 8271 controller through its dying days, and only applies to single density Acorn DFS systems. Recovering a disc when a fault occurs at track 00 sector 01, losing file position information on the disc, is probably not worth the effort, as once they have occured disc faults tend to multiply and corrupt the entire disc.

Recovering from a fault at track 00 sector 00 is a little easier, as only filenames are stored here, along with half the disc title. First, take a disc with an uncorrupted track 00 sector 00, which has a number of files stored on it in excess of the number stored on the corrupted disc, preferably the maximum 31. Then, using a disc sector editor, graft the uncorrupted sector onto the corrupted disc.

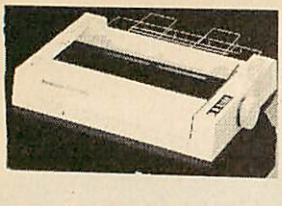
Hey presto, one recovered disc. The filenames will all be wrong but the number of files will be correct along with the load addresses and so on. The disc title will be wrong too, but at least the disc can now be backed up and used again.

Also, re: Paper Size Problem (same issue). A4 paper is typically 70 lines long, rather than the 66 of 11 inch paper. In *View*, the stored command PL 70 can be used.

Alternatively, your printer may allow you to define the length of the page in lines from software, eg, Escape C n on the Star NL 10, where n is the number of lines.

John Dowdell
Hampshire

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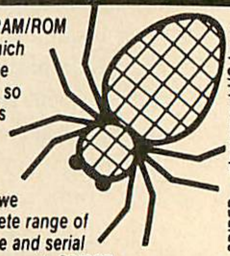
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HINTS & TIPS

Martin Phillips gives a tutorial on *ViewSheet* and shows how to calculate the date

USING VIEWSHEET

I have finally done it. After months of indecision, I decided to get to grips with *ViewSheet*. It has sat there in my BBC Master for over a year, but apart from a quick dabble when the machine arrived, I had never touched it. I got a pleasant surprise. It is a remarkably versatile piece of software and, although you would never guess from the handbook, quite easy to use. Here lies a problem, however — the *un*Welcome Guide that comes with the Master pretends to give instructions on using *ViewSheet*. In reality it skips so much that the program seems impossible to use. This month and next I shall be showing how you can create a simple home finance spreadsheet and print it out. If this appeals and you think the program has some potential, then try to get the proper *ViewSheet* manual. It is essential reading, if rather difficult to get into. The *ViewSheet User Guide* is about 140 pages long (compared to 21 pages in the Welcome Guide).

First, let's make a simple spreadsheet to keep track of spending (to keep my bank manager happy). Before you start, find and insert the *ViewSheet* keystrip. Then type: *TV0,1 Return. The screen will now display the following:

```
ViewSheet
Bytes free 27150
Editing No File
Screen mode 7
=>
```

The number of bytes free given above is for a BBC Master. This will be different for *ViewSheet* in another type of Acorn computer, but it matters little. Mode 7 is not convenient for displaying a spreadsheet, as you cannot get enough information on the screen at one go, so change to mode 128 and put a stop to any flicker on your screen. Type:

*TV0,1 ‹Return›
*SHADOW ‹Return›
MODE 128 ‹Return›

ViewSheet users who have a standard BBC model B or an Electron should use mode 0 rather than mode 128. To make the text easier to read, hold down CTRL and press S, then type '@4@@@'. Do not follow each keypress by a Return. Once this has been typed in, the screen background colour will change to blue. Other colours can be used for the background instead of blue if desired by changing the number four to another number in the range zero to six. I find white on blue the easiest to read. Now press Escape, and the screen will look like figure 1.

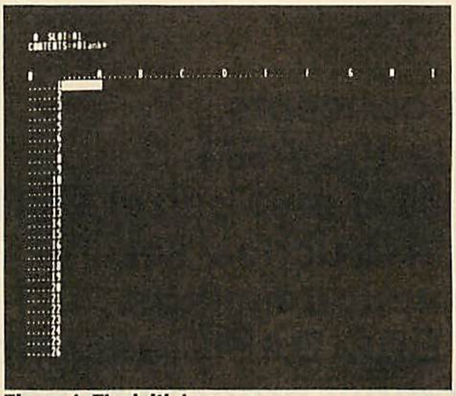


Figure 1: The initial screen

Now for the spreadsheet. In its simplest form we will need details of cheques made out, credits in, a deposit account (I am always hopeful), and a grand total. For the details of the cheques made out we will need the cheque number, the date, the amount and a running total. This can be the first part to be put it. The white block on the screen will be in slot A1 as shown in figure 1. First move this to slot B1 using the right cursor key. Then type:

DEBIT

this will be written just below the word 'contents' at the top left-hand corner of the screen. On pressing Return this will be placed in slot B1. Now use the cursor keys to move the white block to slot A2, type 'Number' and press Return. This will display 'Number' in the spreadsheet in slot A2. Now move across to slot B2 and enter the heading 'Date', in Column C enter 'Value' and in Column D enter 'Total'. Then move down a slot and back to A3 and type seven hyphens and press Return. In each of the other three columns, put a row of hyphens in Row 3.

Now move the cursor to slot A4, enter the number one and press Return. We could now go down Column 1 and keep putting in the next cheque number. This would however soon start to get tedious. A much easier way is to move down to slot A5 and then type:

A4+1 ‹Return›

Now the number two will be printed in slot A5. So far so good. Now move down to slot A6 and press key f0. The words

From – To?

will appear. Now type:

A5-A6A23 ‹Return›

Then the words

R)elative, N)o change?

will appear. Press 'R' for relative. Now, as if by magic, the numbers one to 20 will be entered in Column A. See figure 2.

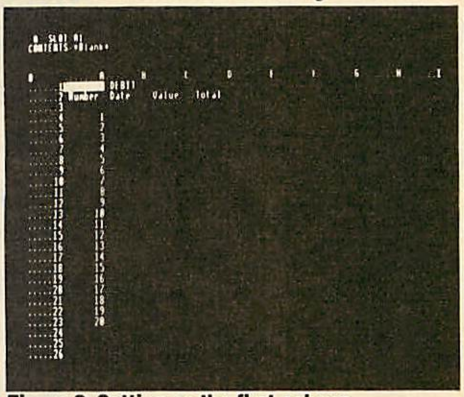


Figure 2: Setting up the first column

To begin to understand the power of a spreadsheet, move the cursor back to slot A4 and enter the number 1000. The whole column will recalculate and give cheque numbers in the range 1001-1050. Thus it is very simple to alter the cheque number range. The formula A5-A6A23 means copy the formula in A5 into slots A6 to A23. The pressing 'R' makes each slot relative to the previous one. By stepping down through each slot you can see how the formula changes – the slot formula is show at the top of the screen. Now we can put in a formula to take the previous total and subtract from it the new cheque value to give a new running total. Move the cursor to slot D4 and type:

-C4 ‹Return›

Move to slot D5 and type:

D4-C5 ‹Return›

Move to slot D6 and type:

‹f0›

D5-D6D23 ‹Return›

R R

To enter the three other parts of the spreadsheet, enter the following into the slots stated. To make it easier, the slot number is given by *ViewSheet* in the top left-hand corner of the screen.

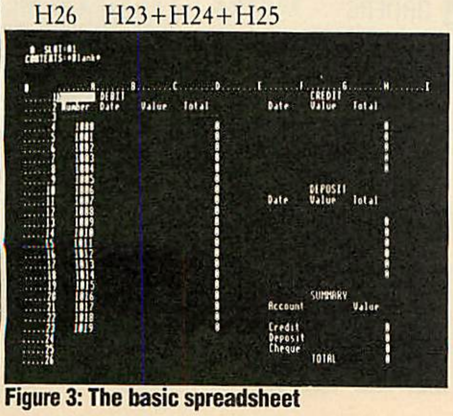
G1	CREDIT
F2	Date
G2	Value
H2	Total
F3	-------
G3	-------
H3	-------
H4	G4
H5	G5+H4
H6	‹f0›H5-H6H8

Then press R twice, once for each slot reference in the H5 formula. This will create the credit entries for the current account.

G10	DEPOSIT
F11	Date
G11	Value
H11	Total
F12	-------
G12	-------
H12	-------
H13	G13
H14	G14+H13
H15	‹f0›H14-H15H18

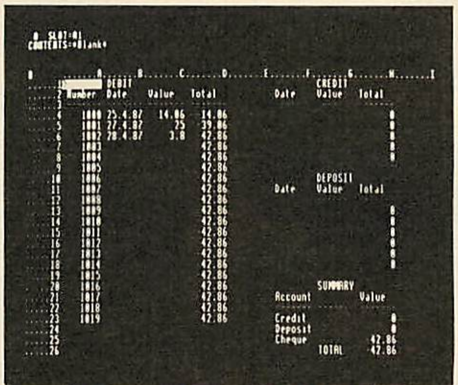
Now press R twice. This will give information on the deposit account.

G20	SUMMARY
F21	Account
H21	Value
F22	-------
G22	-------
H22	-------
F23	Credit
F24	Deposit
F25	Cheque
H23	H8
H24	H18
H25	D23
G26	TOTAL
H26	H23+H24+H25


Figure 3: The basic spreadsheet

This will provide the summary, with a final total, and the spreadsheet should appear as in figure 3.

As it stands it is quite useful, but it can be improved upon considerably. One problem is that the numbers do not always line up properly. This can be seen in figure


Figure 4. The numbers are not aligned

4, with the example cheque values. The sheet can be tidied up by pressing ‹f1› (edit window). The word

Window?

will appear. Type:

0 ‹Return›

and the display will be as below.

```
Wi TopL BotR Pos Cw Bw FMT Opt
0  A1   I19      7  7  FRM
```

Wi refers to the window number. *ViewSheet* will allow 10 windows (0-9).

TopL is the top left-hand slot of the window.

BotR is the bottom right-hand slot of the window.

Pos gives the position of the window in the screen area.

Cw gives the column width. This can be in the range 3-253 characters.

Bw gives the dotted left-hand border width.

Fmt gives the number of decimal places displayed in the slot. The following codes can be included:

F . . . Floating point display

D . . . Fixed number of decimal places (it must be followed by a number)

R . . . Right justification

L . . . Left justification

M . . . Display negative number with a minus sign

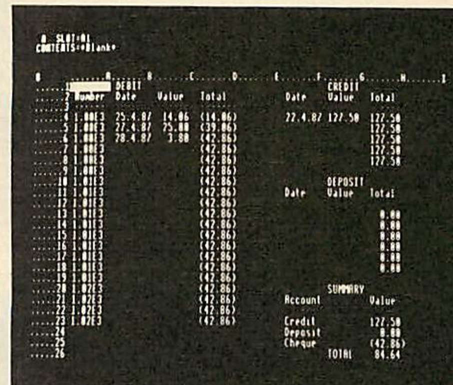
B . . . Display negative numbers with brackets

Opt Options. One or more options can be included, to control in detail the way the sheet is displayed or printed out.

In order to tidy up this spreadsheet, enter the following numbers:

W1	0
TopL	A1
BotR	H26
Pos	
Cw	7
Bw	7
Fmt	D2RB
Opt	

and press Return. To skip past those numbers that do not need changing, use CTRL and the right cursor key. Now the sheet will look like figure 5, with all the numbers lined up showing two decimal places. All the debits are shown in brackets alongside the credits.


Figure 5. All neat and tidy

The size of each table has been kept small so that it would all fit on to the screen at once. They can of course be extended if you so wish.

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The function 'FNday' in listing 1 will calculate the day of the week from the date. It returns a number from zero to six. Zero corresponds to Sunday and six to Saturday. Note that they year must be in the range 1901 to 2099; this is because 1900 and 2100 are not leap years. Modifying the program to include more centuries would be very easy. Years divisable by four are leap years unless they end in 00 and are not

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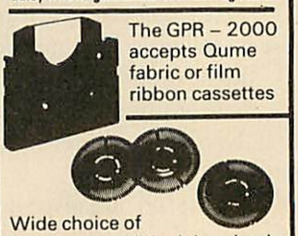
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divisible by 400 (2000 is divisible by 400, so it is a leap year). The main program shown in listing 1 demonstrates the use of 'FNday' and also shows one way of converting the day number (zero to six) to a three-letter string ('Sun' to 'Sat'). Listing 2 uses the function 'FNday' to find the day of the first of the month. It uses this to produce a calendar for any month in any year (between 1900 and 2100).

If you want to use either 'FNday' or 'FNcalendar' in your own programs simply include them at the end and use 'FNday (date%, month%, year%)' or 'FNcalender (month%, year%)', where date% is the day of the month and must be in the range one to 31, month% is month number and is in the range one to 12, and year% is the year and is in the range 1901-2099. The 'day' function may also be useful to set the Master's clock as, although it stores the day of the week, it doesn't actually calculate it from the date.

A BASIC INPUT ROUTINE

Philip Hawthorne from Portadown has sent in a handy string input routine (listing 3). It uses FNgetstr(len,old$), to offer the user a default string (old$) which may be accepted by just pressing Return. Alternatively the user may type in a new string, the length of which cannot exceed that specified by the 'len' parameter. The default string is displayed between '< >' symbols which show the maximum length of the allowed string. The computer beeps if the user tries to enter too many characters or tries to delete past the first character. If Return only was pressed, then the function returns the default string, otherwise it returns the new string. It is particularly useful for inputting filenames for instance. Listing 3 gives a simple demonstration of the function.

QUICKFIRE CORNER

■ Do remember that it is not necessary to list all of a program:

LIST 100 will list just line 100

LIST 100,200 will list lines 100 to 200 only

LIST ,100 will list up to line 100

LIST 100, will list all lines occuring after line 100.

If working on a section of a program, then program a function key to list part of the program:

*KEY0 LIST 100,200 |M

When function key 0 is pressed it will list lines 100 to 200.

■ POS will return the horizontal position of the text cursor on the screen. This is useful, for detecting whether there is room to print another word on the same line, or whether to start a new line. VPOS will similarly return the vertical position of the text cursor.

■ To move text a specific number of spaces across the screen, TAB followed by a single argument will print that many spaces. SPC is another way of printing spaces: SPC(10) replaces "   ";

■ *FX11,0 will turn off the auto-repeat facility on the keyboard. Useful for programs where the user is not expected to be familiar with the keyboard. *FX12,0 will reinstate the auto-repeat facility to give normal delay. For fun, type *FX12,1 and press Return then *FX11,1 and press Return again!

■ Its a good idea to take the cover off the BBC micro now and again, remembering to unplug it from the mains first. You will be amazed at the dirt that collects under the keyboard. Clean between the keys with a clean *new* paintbrush. Unfortunately this is not so easy to do with the Electron or Master Compact, as the keyboard is fastened to the top part of the case, and owners are advised not to try to open up the machine unless absolutely necessary.

■ If a function key needs to be recalled, then type AUTO 30000 and press Return, then press the function key. Its contents will appear as a line or series of lines, and they can be edited. A high AUTO number is used so the function key definition does not interfere with your program.

JARGON BOX

Default The option or value normally available, or normally set by the computer itself, eg the default disc drive when the computer is switched on is always drive 0.

Slot A single 'box' in the spreadsheet, which is usually seven characters wide and one line deep. The slot can store either a number or text. Each slot can be individually identified by the letter across the top to give the column, and the number down the side to give the row.

Spreadsheet A program to store a chart of numbers and perform calculations on them.

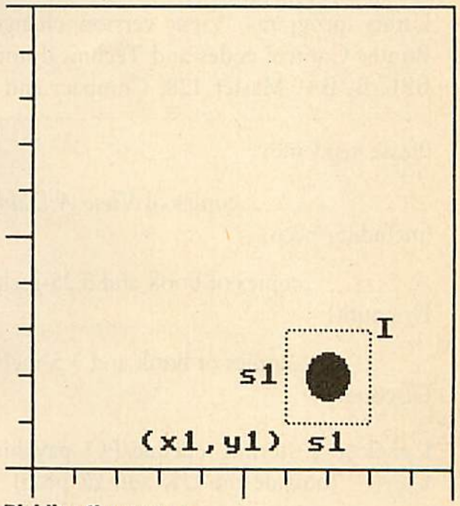
Window A small area of the whole picture. In the case of a spreadsheet, it can be much bigger than is possible to display on the screen all at once. The screen therefore shows a part of the whole spreadsheet. A window does not have to occupy the whole screen, thus it is possible to have more than one window on the screen at once. The window's size can be set by the user.

MANDELBROT SET ARTICLES

Mr E B Page of Alloa, writes about the Mandelbrot set articles by David Johnson-Davis in the May '86 and May '87 issues of *Acorn User*. He outlines a simple way of zooming in on a particularly interesting area of the set.

Take a set of starting values for X, Y and S, say 0.25, −0.695 and 0.15, which allow you to look at a section on the edge of the Mandelbrot set. You then want to zoom in on some small detail, and need to calculate new values for X, Y and S. So imagine the screen as a square, with sides S long, and with (X, Y) at its bottom-left hand corner. Mentally divide the sides of the square into 10 parts, as below. The interesting feature is at I, seven-tenths of the way along the bottom (the X axis), and two-tenths up S on the left (Y axis).

Looking at the diagram indicates that the



Dividing the screen

new values to be tried are:

$x1 = x + s * 6/10$

$y1 = y + s * 1/10$

$s1 = s * 2/10$

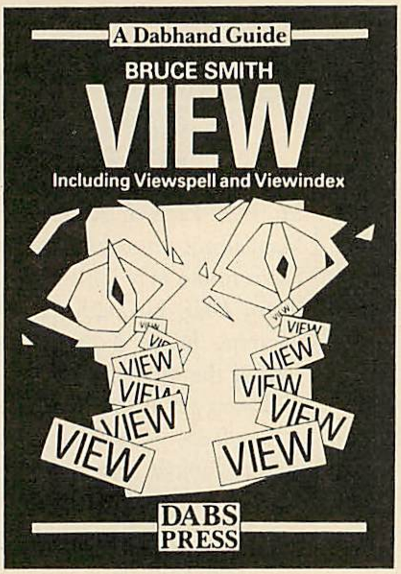
so in this case, x1-0.34, y1=0.680 and s1=0.03.

This should reduce guessing where abouts to zoom in on next.

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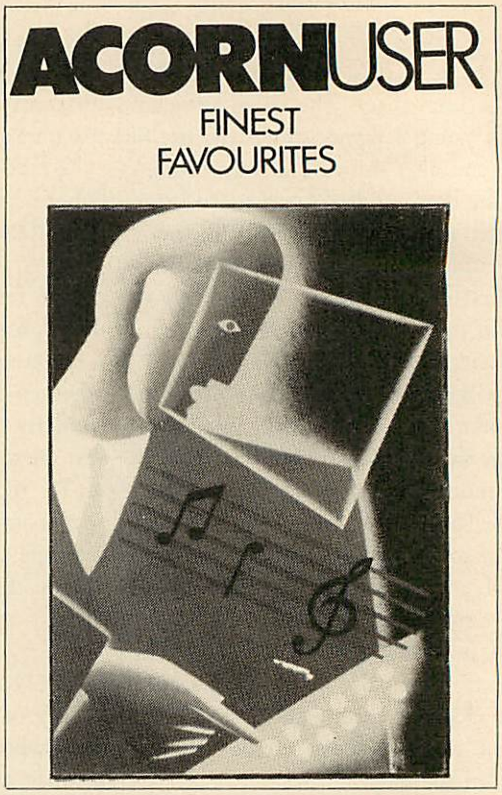
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FIRST BYTE

SOUNDING OFF

How to change from bleeping Basic to musical machine code

Tessie Revivis

In Basic, the micro's noises are controlled by the SOUND and ENVELOPE commands. These commands can both be simulated in machine code using the operating system (OS) routine OSWORD. Let's examine SOUND first of all, by looking at it in Basic. Enter the following line and press Return:

SOUND 1,-15,150,100

You'll get a high pitch tone. Each number in the command controls a particular aspect of sound generation. In order they are: channel, amplitude, pitch and duration. There are four channels on the BBC and Master micros and by issuing SOUND commands using different channel numbers (zero to three) it is possible to play several sounds together. Varying the amplitude and pitch will change the sound played, and of course duration decides how long that sound plays for. On the Electron there is only one sound channel, so its musical capabilities are more limited.

In assembler, sound is generated by calling OSWORD with the accumulator holding the number seven. To pass the channel number, amplitude, pitch and duration of a note to the OSWORD routine they must be placed in an area of memory called a parameter block. There is nothing special about a parameter block except that we must know where it is in memory. The address of the parameter block is passed to the OSWORD call via the two index registers, X and Y. Because the address is 16 bits long, and the index registers hold only eight bits each, the Y register holds the high byte of the address and the X register the low byte of the address.

For example, a useful place to place the parameter block is in the zero page bytes from &70 to &8F which are free for use in *Basic*. As the bytes from &70 tend to be used for byte and data storage it is a good idea to use memory from &80 but it only matters if other parts of your program use sections of the &70 – &8F allocation. We would set up the three registers as follows:

```
10 REM Easy Sound
20 REM SOUND 1,-15,150,100
30 DIM code% 20
40 P%=code%
50 [LDA #7
60 LDX #&80
70 LDY #&00
80 JSR &FFF1
90 RTS
100 ]
110 :
120 REM Poke values
130 !&80=1  : REM Channel
140 !&82=-15: REM Amplitude
150 !&84=150: REM Pitch
160 !&86=100: REM Duration
170 CALL code%
```

Listing 1. Poking the sound parameters

LDA #7 \ OSWORD call 7 = SOUND
LDX #&80 \ low byte of address
LDY #&00 \ high byte of address

The OSWORD call is located at &FFF1 so one more instruction must be executed:

JSR &FFF1

But, before we do this we must first place all the sound information into the parameter block, in a precise order, as detailed in figure 1. X & Y together must point to byte 0 in this block.

Byte	Purpose
0	Channel, low byte
1	Channel, high byte
2	Amplitude, low byte
3	Amplitude, high byte
4	Pitch, low byte
5	Pitch, high byte
6	Duration, low byte
7	Duration, high byte

Figure 1. The parameter block

The figure shows that two bytes are allocated for each part of the SOUND information. All we now need to do is to convert the SOUND parameters into a form usable by the assembly language program. The lazy way to do this is by poking the memory locations from Basic. We can do this first to see that the OSWORD 7 call does work. Enter and run listing 1 to prove the point. Try changing the various values to see that the program does what you expect.

Of course that's the easy way out. If we wish machine code programs to be self contained, then the task of setting up the parameter block should also be assigned to the assembler. Converting the channel number (1), the pitch (150) and the duration (100) are all straight forward, as the number can be loaded directly into the register concerned using immediate addressing and then put into the correct place in the block. As all three are just single-byte numbers, the byte is deposited into the low byte slot and a zero is placed into the high byte slot.

Converting the amplitude -15 into a two-byte number is less straightforward and involves some basic maths. To represent -15 in a two byte binary number we must find its 'two's complement' value. Even if you are not too sure what this means you should still be able to calculate the value, as the sum is easy. Enter from Basic:

PRINT ~ (&FFFF-15)+1

The result will be FFF1 in hexadecimal (base 16). That is the value that must be placed into the two amplitude bytes; &FF is the high byte and &F1 is the low byte. Of course if the amplitude value was -13 then the sum would need to be adjusted:

PRINT ~ (&FFFF-13)+1

Now that we have the information it can be read and deposited into the parameter block and the OSWORD routine called. Listing 2 shows one way of doing this.

This method of LDA and STA is rather memory intensive and really for longer sound sequences it is better to employ a

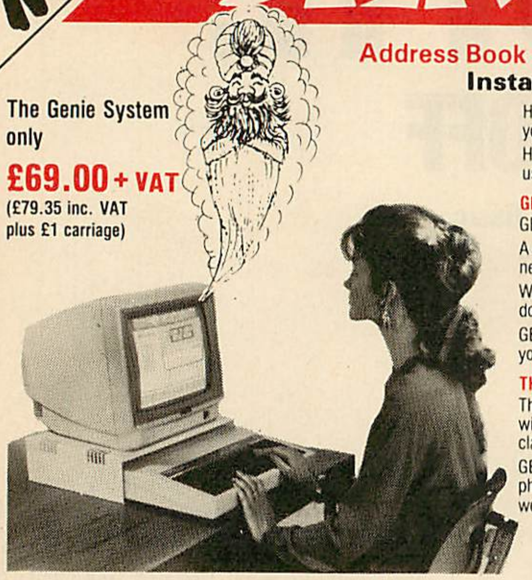
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```
 10 REM Machine Code Sound
 20 REM SOUND 1,-15,150,100
 30 DIM code% 50
 40 P%=code%
 50 [
 60 LDA #1   : STA &80
 70 LDA #0   : STA &81
 80 LDA #&F1: STA &82
 90 LDA #&FF: STA &83
100 LDA #150: STA &84
110 LDA #0   : STA &85
120 LDA #100: STA &86
130 LDA #0   : STA &87
140 LDA #7
150 LDX #&80
160 LDY #&00
170 JSR &FFF1
180 RTS
190 ]
200 CALL code%
```

Listing 2. Machine code sound

within your program. This technique involves the use of vectored, or indirect, addressing – a subject that we have touched on only briefly up to now. Another more versatile method, though more demanding on memory, is by using a macro – this is outlined below.

Macro envelopes

In Basic, the ENVELOPE command is used to control the volume and pitch of a sound as it is played. As with SOUND the ENVELOPE command is performed from machine code via OSWORD, and in this case the accumulator must be loaded with the number eight.

As with the parameter block for SOUND, on entry to the envelope definition call the index registers must hold an address in memory where the envelope information is held. This address is held in the usual X = low byte, Y = high byte form. The ENVELOPE statement is much more complex than the SOUND one, and requires 14 bytes of information in all. Full details can be found in your User Guide.

As with all our previous examples let's kick off with a simple Basic program that we can then convert into assembly language – listing 3 is the one.

There are several components here. The ENVELOPE and SOUND statements are obvious. However the SOUND statement will change each time as the pitch of the note (defined by X) is increased in steps of one from zero to 220. To implement this in assembler we will need to have a control loop that will reset the SOUND parameter block, and call OSWORD 7 each time.

```
   10 REM Envelope warbl
er
   20 ENVELOPE 1,1,6,6,6
,2,2,1,126,0,0,&82,126,1
26
   30 X=1
   40 REPEAT
   50 SOUND   1,1,X,1
   60 X=X+1
   70 UNTIL X=220
```

Listing 3. Envelope warbler

The ENVELOPE parameter block is defined in the same way as for that of the SOUND parameter block except that there are a few more parameters to place in memory. Rather than doing a long sequence of 'LDA #byte, STA memory' commands, we can implement a 'macro'. A macro allows sections of assembly language programs to be continually assembled as and when required. The following short example will make the process clear:

```
FOR loop = 0 to 9
READ byte
[LDA #byte
STA memory+loop
]
NEXT loop
```

Here the bytes of assembler are held within a loop. The loop will execute 10 times. Each time through the loop a byte of data will be read into the variable 'byte'. The assembler is entered and 'LDA #byte' is performed. 'STA memory+loop' is then assembled and we come out of the assembler to execute the next loop. In this example although only four bytes of assembler have been written, 40 bytes of machine code will be assembled.

Listing 4 uses this macro technique to assemble the machine code equivalent of listing 3.

The data for the ENVELOPE and SOUND operations is held in data at the end of the program. The ENVELOPE macro (lines 190 to 320) should be easy to follow. As there are 14 items of information the loop is from zero to 13. Note how the label 'envelope' is defined before entering the macro loop to point to the start of the machine code. Once the macro has been assembled the OSWORD 8 call is assembled. The SOUND macro is assembled in an identical manner (lines 340 to 420), the difference here being that there are only eight data items.

Finally, the pitch change loop is assembled (lines 510-580). This increments the low byte pitch value (held at &84) from zero to 220 calling the subroutine at the 'execute' label each time to perform the new SOUND command.

```
   10 REM Machine Code E
NVELOPE
   20 REM By Tessie Revi
vis
   30 REM for B/B+/M/C/E
   40 REM (c) Acorn User
 July 1987
   50 :
   60 DIM code% 256
   70 env%=&70
   80 snd%=&80
   90 PROCassemble
  100 CALL envelope
  110 CALL sound
  120 CALL warble
  130 END
  140 :
```

Continued ►

```
  150 DEF PROCassemble
  160 P%=code%
  170 [.envelope
  180 ]
  190 FOR loop=0 TO 13
  200 READ byte%
  210 [
  220 LDA #byte%
  230 STA env%+loop
  240 ]
  250 NEXT loop
  260 [
  270 LDA #8
  280 LDX #env% MOD 256
  290 LDY #env% DIV 256
  300 JSR &FFF1
  310 RTS
  320 ]
  330 :
  340 [.sound
  350 ]
  360 FOR loop=0 TO 7
  370 READ byte%
  380 [
  390 LDA #byte%
  400 STA snd%+loop
  410 ]
  420 NEXT loop
  430 :
  440 [.execute
  450 LDA #7
  460 LDX #snd% MOD 256
  470 LDY #snd% DIV 256
  480 JSR &FFF1
  490 RTS
  500 :
  510 .warble
  520 JSR execute
  530 LDX &84
  540 INX
  550 STX &84
  560 CPX #220
  570 BNE warble
  580 RTS
  590 ]
  600 ENDPROC
  610 :
  620 REM Envelope Data
  630 DATA 1,1,6,6,6,2,2
,1
  640 DATA 126,0,0,&82,1
26,126
  650 :
  660 REM Sound Data
  670 DATA 1,0,1,0,0,0,1
,0
```

Listing 4. Using macros

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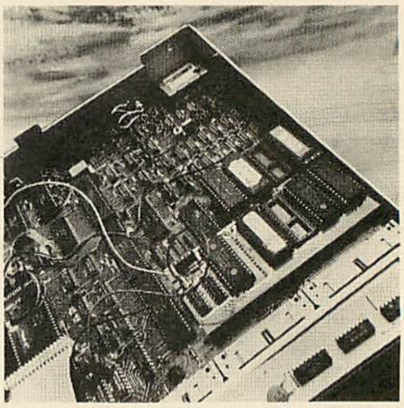
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The board is British made and comes with excellent after sales support. A battery back-up upgrade can be fitted to the RAM, as can read/write protect switches.

As written in *Acorn User* when we reviewed the board last month, 'This board rates as one of the best I've seen. The overall quality is excellent – well laid out and robustly made.' You won't find a cheaper or easier way to upgrade your micro's memory than this.

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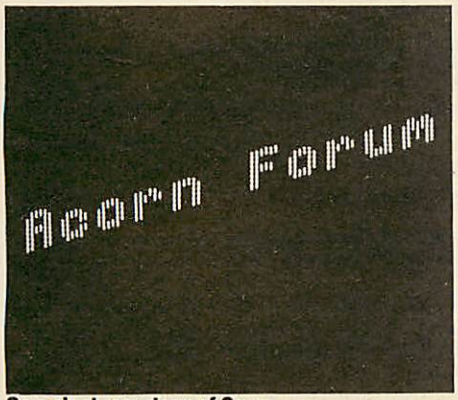
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ACORN FORUM

David Atherton reviews your ideas on angled text, shadow screens and disc control

ANGLED TEXT



On a slant, courtesy of Garry

Garry S Smith of Ouston has sent us an interesting routine (listing 1) to produce large text on screen at an angle. Garry has not used the usual method (OSWORD &0A) of reading character patterns, but instead is peeking them directly from the screen. Garry's routine insists that the target text is printed at the top left corner of the screen, but as colour one has been defined as black, you don't see it.

£5 ERROR GENERATOR

A quick but useful tip from Jonathan Temple will help those of you trying to debug programs that use ON ERROR constructs. You've probably realised that it isn't easy to generate certain errors, such as 'Catalogue full' or 'Compaction recommended'. The short key definition (listing 2) will set up the machine so that typing:

*CODE <n>

were <n> is the number of the error, ie that value that is held in ERL when the error occurs.

To use the feature, find the place in your program where you wish an error to occur. This might be a *LOAD statement, or perhaps an INPUT statement. Find the error number of this error (usually at the back of the relevant User Guide) and then insert the code command on the line immediately before the one which may generate an error. So if line 200 contained a *LOAD command, and you wanted to simulate a 'File not found' error, you would enter a temporary line 199, *CODE 214. This will correctly set up ERR and ERL, and thus your ON ERROR routine should be able to handle it.

The routine is clever in the way it works. It pokes byte &8E into location &A00, followed by the address &A04. This disassembles to STX &A04. The pling (!) operator transfers four bytes at a time, making sure that &A03 and &A04 are loaded with zero. &A05 onwards is filled with the string 'Error' followed by a zero byte. The final two instructions load the USERV vector with the address &A00.

```
*KEY 0 "M%=&A00:?M%=&8
E:M%!1=M%+4:$(M%+5)=|"ER
ROR|"+CHR$0:?&200=M%:?&2
01=M%DIV256||M"
```

Listing 2. ON ERROR key definition

The *CODE command works by taking one or two decimal parameters from the user, and jumping to the location pointed to by USERV, with those parameters in X and Y. Normally, the *CODE command has no effect, as USERV points to a 'Bad command' error entry point. This routine makes use of this underused feature. The contents of X register – the error number – are placed in &A04, and then a BRK is executed. The memory after the BRK is set up in the correct error message format:

BRK
Error number
Error message string
BRK

Unfortunately the routine doesn't actually generate the error string, but gives the message 'Error'. But for debugging ON ERROR statements this is not important.

ASSEMBLER DISC CONTROLLER ACCESS

Dr A J Lindop of Farnborough has a Cumana QFS system (a disc filing system) which has been causing problems with protected software. The Cumana QFS works with a 1770 disc controller, like the Solidisk and the interfaces. His particular problem is that after his protected software issues an unusual OSWORD &7F command – say to read a 1024 byte sector numbered 255 – it expects to see a 'no error' code – but his 1770 controller can't manage this. Dr Lindop's listing catches OSWORD &7F, and in certain circumstances removes the error code.

Most readers may not have a QFS, but the program is a model of clarity illustrating the technique of intercepting an operating system vector, and performing that operating system call within the intercept, without going into an endless loop.

The program (listing 3) when assembled and run, claims the WORDV vector, situated at &20C and &20D. The last few lines of the program do this, and any OSWORD call issued by either the user (a program) or the operating system itself will be passed not to the standard routine, but instead to the code at start%. This claiming of the vector is cancelled by a reset, so the program must be run again if you press Break.

The assembly language starts by storing the OSWORD call number, and control block address. The clever technique of:

LDA store+4
PHA
LDA store+3
PHA

makes a return address, and has the effect of saying that the next RTS will work as a JMP (store+3). The program then JMPs directly into the operating system (OS) to perform the OSWORD call. OSWORD, like most OS routines, terminates with an RTS instruction, and this causes control to be passed to the rest of the routine, labelled as 'patch'.

After OSWORD has been processed, the code at 'patch' checks to see if it was an OSWORD &7F, and if so, whether the command code (see my article in *AU* July '86 for OSWORD &7F command codes) was &56 or &57. If so, the Cumana QFS may generate error &20. The routine checks for this, and if an error &20 occurs, it cancels it, ie, zeros the error byte. That the routine preserves all registers and flags.

The same principle could also be used for example to debug code which called OSWORD, or to add to such code – such as altering data before the main program

looks at it. Other system calls such as OSBYTE and OSFILE could also be intercepted or followed in the same manner.

Full marks also to Dr Lindop for submitting the program in *AU* format – one instruction per line.

DIGITAL JOYSTICKS

Following my articles on the Master Compact, many people have asked me how they can use the wide range of Atari-type joysticks on the BBC B and Master 128. The answer is that there are very cheap interfaces available for this. I use the Datex interface, produced by EEC Distribution Services, 14 Western Parade, Barnet, Herts EN5 1AD. It costs £4. You often find these items on sale at exhibitions or your local dealer should have one.

SHADOW SCREENS

Many people have contacted me with problems about the shadow screen system on the Master. The sideways RAM is clearly understood, but the shadow screen less so. In particular people are confused by the variety of FX calls available.

The shadow system is two banks of 20k of memory, the normal screen and the shadow screen. In essence there are three memory control calls which determine whether the shadow or main banks is to be used for that control. They are:

a) Which of the two banks is read from and written to by direct access user code such as LDA #&3000 or PRINT ?&7FFF

b) Which bank is written to by the operating system's VDU code

c) Which bank of memory is displayed on screen, ie, sent to the video controller.

The first switch is controlled by *FX108. If X=0 (*FX108,0) the main memory is accessed by ordinary reading and writing to memory locations between &3000 and &8000. If X=1 (*FX108,1) then shadow memory locations are used. Note that this is irrespective of the screen/VDU settings.

The second switch determines where VDU output will go. All your printed strings and graphics PLOT commands work by altering screen memory. *FX112 determines which bank of memory is written to by the operating system when processing VDU calls. If X=1 (*FX112,1) then main memory is used. If X=2, the shadow memory is used. If X=0, the bank used is determined by the current screen mode – if a shadow mode is active, shadow memory is used. This is not necessarily the same bank as that written to by your direct access code. If the *FX108 and *FX112 settings are different, then the VDU code will temporarily switch in the bank it needs, while doing VDU plotting, and then switch it back before returning control to the user. As long as you stick to legal programming, you won't run into any problems with this.

The third switch decides which bank of memory is displayed on screen. This may be the same bank as selected for direct writing by *FX108, and/or VDU plotting by *FX112, or it may be neither. This is set by *FX113, and again if X=1 (*FX113,1) the main memory is displayed, if X=2 the shadow memory is displayed. If X=0, the bank display corresponds with the current mode, whether shadow or not.

There is another call *FX114, which is equivalent to *SHADOW. This does not alter anything directly. What it does is to select a shadow mode in response to any subsequent MODE command, whether in the range zero to seven or 128 to 135. This is provided so that software originally written for the BBC model B which performs a MODE command in the range zero to seven, and which cannot be altered (ROMs, protected software and so on) can use shadow memory. There is no need to use it in new programs, just use MODE numbers from 128.

Listing 4 is a short program to show the effect of the *FX112, *FX113, and *FX108 commands. Note that drawing can actually take place to the hidden screen. Although the procedure PROCswitch always switches accesses together, this is not mandatory, and you could have all plotting done to the hidden screen. PROCpoke shows how directly writing data to screen is affected by *FX108.

Only *FX108 is implemented on the BBC B+ micro, but you can flick between the two screens by flipping the top bit of &FE34, the memory control register. This bit cannot be read back, but *FX151,52,128, (see the example in listing 5) will always select the shadow screen, and *FX152,52,0 will always select the main screen. None of the other bits of &FE34 that are used in the Master series are implemented on the BBC B+ micro.

Note that the much-published technique of accessing shadow memory using addresses in the range &FFFE3000 to &FFFE7FFF was implemented on the BBC B+ micro in the disc filing system (DFS) and may not work with early versions of the BBC B+ 1770 DFS. Also, contrary to the Master Reference Guide Part 1, it doesn't work on the Master 128.

COMMUNICATIONS LINK

Setting up the RS423 interface to swap data between two micros can be a real source of problems. When two computers communicate via a serial link, three things have to be right for the link to be reliable.

Firstly, the computers have to be connected together, either directly or via modem and phone line. Assuming that the physical link is correct, and the plugs and cables have been correctly made, the second factor to check is the baud rates. These are the speeds at which the computer transmits and receives data. Receive speed can be set with OSBYTE 7 (*FX7), and the transmit rate with OSBYTE 8.

The third vital ingredient is the data format. Each character of data is sent in a predefined format. Before the actual character is sent, there is a start bit, to warn the other computer that a character is about to arrive. Then comes the character itself, which can be seven or eight bits long. This is followed by an optional parity bit, chosen so as to make the total number of binary 1's in the character either odd (odd parity) or even (even parity). The last part of the format is the stop bits; there can be either one or two of these.

The data format can be set using OSBYTE &9C or *FX156,X,227 where X is as follows:

X	char bits	parity	stop bits
0	7	Even	2
4	7	Odd	2
8	7	Even	1
12	7	Odd	1
16	8	none	2
20	8	none	1
24	8	Even	1
28	8	Odd	1

The most usual format is seven bits, even parity, one stop bit, but using this method, any format can be set.

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12" hi res. P31 Green Phospher Screen. CVBS input. Audio input. Band width 20 MHz. 2000 CHRS Dispay. Adjustable viewing angle. £79.00
Phillips BM 7522
Amber Screen £95.00
Phillips BM 7542
Dedicated WD phosphor Screen monitor £95.00
Philips BM 7513
12" Green IBM compatible £120.00

TAXAN
New Taxan Monochrome Screens
Taxan KX117
12" Green Screen P31 £89.00
Taxan KX118
12" Green Screen P39 £99.00
Taxan KX119
12" PUL Amber Screen £99.00

COLOUR MONITORS
Microvitec 1431 Std Res £201.25
Microvitec 1451 Med Res £255.00
Microvitec 1441 Hi Res £391.00
Microvitec 2030 Cs 20 Std Res £425.50
Microvitec 1431 AP Std Res £224.25
Microvitec 1451 Ap Med Res £293.25

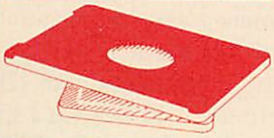
PHILLIPS
New from Phillips
Phillips CM8833
14" CVBS and RGB medium resolution colour monitor. IBM PC compatible. Fast blankup to enable superimposing. Stereo Audio. Ear phone socket. 600 dots x 285 lines vertical £269.00
Phillips CM8852
14" RGB professional med res colour. 700 dots x 285 £289.00
Phillips CM8873
14" RGB high resolution colour monitor Res 850 x 480 £550.00

Taxan Super Vision 620
High Resolution colour monitor with several unique features, at an affordable price.
SUPERVISION 620
12" RGB High resolution colour monitor. Fully compatable with IBM, Apple, BBC and most other Personal Computers. 635 x 312 line resolution. Positive or negative sync input. Text colour switchable to green, amber, white or blue or inverse white. Super high contrast tube. Optional tilt-swivel base (with clock/calendar available). Special introductory offer. £299.00

NEW SUPERVISION 625
12" high resolution colour monitor. 661 dots x 312 lines £369.00

MONITOR TO TV CONVERTER
AV 7300 Colour tuner module Push button control. 12 preset channels. Built in aerial. Compact design. Composite video only £69.00

SPECIAL OFFER
Mitsubishi 1404 Medium Resolution Monitor with 640 X 200 Pixels RGB available with IBM or BBC Leads. £249.00



SWIVEL BASE OFFER
Special summer price Tilt and swivel base for 12" or 14" monitor or TV. "Looks very elegant" at an ubeatable price. £9.95

Disc Drives

MITSUBISHI DISC DRIVES
User Friendly Disk Drives 100% BBC compatible slimline disc drives. All drives are supplied complete with formatting diskette, comprehensive users manual and all necessary cables. All drives are 40/80 Track switchable at the front and have two years warranty.

5¼" Drives without P.S.U.
MD 400A Single 400K Double Sided £118.00
MD 802C Dual 400K Double Sided £219.00

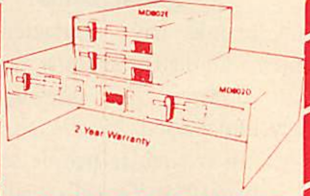
5¼" Drives with P.S.U.
MD 400B Single 400K Double Sided £135.00
MD 802E Dual 400K Double Sided £249.00

SPECIAL
MD 802D Dual 400K Drives horizontally mounted in a monitor stand to fit both the BBC B and the Master series. £269.00

SOURCE DISK DRIVES
Source SD35 3½" disk drive, single drive £85.00
Source SD352 3½" dual drive £149.00
Supplied cased complete with cables, powered from computer. Extended two year warranty.
Source SD35S 3½" single drive with P.S.U. £135.00
Source 352S 3½" dual drive with P.S.U. £199.00
Source SD3545S Combo dual 5¼" and 3½" drives with P.S.U. £249.00

Winchester Disk Drives

Source HD20 Twillstar's 20 Mbyte winchester drive including Acorn DFS ROM complete with P.S.U. £599.00
Source HDP201 Twillstar's 20 Mbyte winchester drive and a 400k double sided floppy drive built in a plynth to accomodate monitor on the top and the computer underneath. Includes ADFS ROM and P.S.U. £869.00
Source TS10 10 Mbyte tape streamer backup unit with utilities £695.00
Othe size hard disks are available, please call for our latest prises.



Accessories

Taxan KIF 4308 buffer compatible with any Centronics interface printer £149.00
Further 64k upgrade available.
Printer/Computer sharers.
2 – 1 £39.00
6 – 1 £79.00

Serial and Parallel T Switches
Parallel T switch £67.85
Serial T switch £67.82

FLOPPY DISKS
Raven 5¼" pack of 10 in a clear library box £15.00
Raven 5¼" rainbow colour pack of 10 in library box £17.00
Raven 3½" single sided pack of 10 in library box £18.00
Raven 3½" double sided pack of 10 in library box £25.00

LOCKABLE STORAGE BOXES
Trackmaster 5¼" 70 x 5¼" lockable £7.95
Trackmaster 5¼" 100 x 5¼" lockable £9.95
Trackmaster 3½" 40 x 3½" lockable £6.95
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Printers

SPECIAL OFFER OF THE MONTH

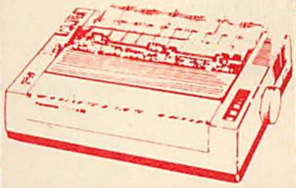
FREE PRINTER STAND

FREE BBC CABLE

200 SHEETS OF PAPAER

When you buy a Panasonic KX-P1081 The faster and enhanced KX-P1081. 120 cps in draft mode. 24 cps in NLQ mode. Fully Epson RX80 and IBM Matrix and Graphics Printers compatible. Standard friction and tractor feed. Operator accesible print mode switch. Standard 8 bit parallel interface. RS232 interface is optional **£179.00**

(Offer ends 31st July 1987)



Juki 5510

- Gives you 180 CPS & NLQ Standards £269.00

Compatibile with both the Epson and the IBM Graphic Printer). Standard 2K memory (expandable to 14K) built-in Parallel Centronics interface and 8-switch international character sets.

If you need colour too, the optional Juki 5510 Colour Kit gives you seven colours. **£112.00**

STAR NL-10

Fine Near-Letter-Quality, 100% compatibility and total reliability all in one easy to use printer. 120 cps in draft mode and 30 cps in near letter quality. **£229.00**

EPSON PRINTERS

Epson FX 800 and FX 1000 range offers *superior printing* and technical features. 200 cps in draft and 40 cps in NLQ. Complete with tractor and friction feed as standard. Offering IBM compatibility, full graphics. Also includes two NLQ fonts, 10,12,17 and 20 cpi, double height and double width with 8K buffer built in.

FX 800	**£369.00**
FX 1000	**£499.00**
FX 800 Sheetfeeder	**£141.00**
FX 1000 Sheetfeeder	**£163.00**

Epson EX 800/1000 High speed printers. 300 cps in 12 cpi mode. Also offers four colour printing.

EX 800	**£465.00**
EX 1000	**£626.75**
Colour option for both	**£62.00**

Epson LX 86 120 cps Epson & IBM comaptible. Near letter quality. standard centronics interface **£229.00**

Epson LQ 800	**£499.00**
Epson LQ 1000	**£669.00**



CANON 55A

Wide version. Fully IBM compatible. **£399.00**

CANON PW1080A

80 column printer with 160 cps draft and 40 cps NLQ with built in friction and tractor feed. Fully compatible with Epson FX80. Standard parallel interface. **£249.00**

STAR NL-10

Fine Near-Letter-Quality, 100% compatibility and total reliability all in one easy to use printer. **£229.00**

STAR NX-15

Same as Star NL-10 but with 136 column width. Both Epson and IBM compatible **£399.00**

MP200

200 cps in draft. 40 cps in NLQ mode. 7K buffer as standard (128 downloadable characters in NLQ) optional 8K memory. IC font cards. **£274.85**

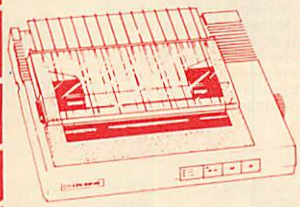


MP201

Same as MP200 with 136 columns **£318.55**

MICRO P MP165

80 Columns. 165 cps in draft mode. 35 cps in NLQ mode. Ultra high resolution graphics. Friction and traction feed. 2 Year warranty. Epson or IBM compatible control codes. **£199.00**



MP135

Just released

135 cps, 80 column printer. Frictio/tractor feed. NLQ. Epson & IBM Compatible **£145.00**

MP480

New

Fast reliable 480 cps dot matrix printer. 74 cps, NLQ, 80 column, fully Epson & IBM compatible, Std parallel **£349.00**

CITIZEN MSPIOE

The new MSPIO with 160 CPS Draft and 40 CPS NLQ. With TWO years Warranty **£269.00**

CITIZEN MSP-15E

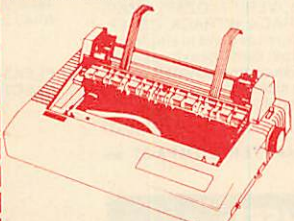
17" Wide carriage . 136 column, operating at 160 cps and at the push of a switch will print near letter quality at 40 cps. Fully Epson and IBM compatible. 8k of standard buffer built in. Standard Centronics are optional RS232 **£379.00**

TAXAN KXP815

Taxan KXP 815 New enhanced KP 810 with 160 cps and fully Epson & IBM Compatible **£299.00**

TAXAN KXP915

Taxan KXP 915 New enhanced KP 915 with 180 cps and fully Epson & IBM Compatible **£420.00**



CITIZEN 120D

Dot Matrix Printer. The 120D precision printer brings to the small business, educational and home user good quality and attention to detail. Its compact size, host of standard features and built in quality and reliability that supports Citizen's unique **full TWO-YEAR warranty** make it a must for all computer users. Fast draft output: 120 cps. Built-in NLQ: 25 cps. IBM and Epson compatible. Plug-in interface cartridge. Tractor and friction feed as standard. Optional cut sheet feeder. **£179.00**

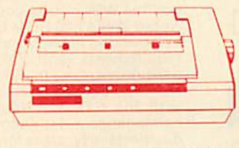
CITIZEN LASER OVERTURE 110

Overture 110 Prints 10 pages per minute. COmes complete with internal controller with print resolution of 300 x 300 dots per inch. Print capability of Standard Text, IBM & Epson bit-map graphics, IBM graphic character set, Epson graphic character set. Resident fonts are: Citizen Pica upright/italic, Citizen Elite upright/italic, Citizen Courier, Citizen Bookface (over 56 typefaces), downloadable one character set in Epson Mode. 11 international character sets. Standard Centronics Parallel and Serial RS232C. Standard 512K memory 384-byte user available. Fully compatible with Epson FX1000 IBM Proprinter & Diablo 630. **£1850.00**

SOURCE

The Complete Solution

INTRODUCES THE NEW TECO VP1814

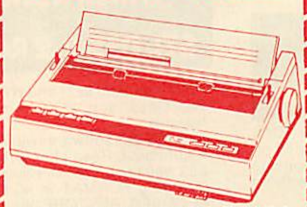


Dot matrix printer. VP1814 is fast highly reliable and easy to operate.

☆ Standard 80 column
☆The high-speed, low energy consumption 9 wire dot head gives printing speed of 189 cps and NLQ speed 36 cps
☆Bi-directional, Logic seeking in text mode
☆The use of fan-fold, roll or cut-sheet paper is possible with adjustable sproket pin feed and friction feed
☆Offers emphasized, double print, super script, sub script
☆Justified print mode are also available including left, centre, right and full justification
☆9 graphic modes are available
☆Both download and inprint buffer can exist simultaneously
☆7K input buffer standard can be expanded to 15K
☆Printing modes selectable at front panel (NLQ/draft, Pica/Elite, enlarge, emphasize, condense, italic
☆11 Language international character font is internalized
☆Both IBM and Epson compatable

MAIN UK DISTRIBUTOR
SPECIAL INTRODUCTORY PRICE
(inc. VAT) **£229.00**

DAISYWHEEL



PANASONIC KX-P3131

A Fully Formed Serial Impact Daisywheel printer with print speed of 17cps. Diablo compatible print wheels. Print pitches available are: 10, 12, 15 and proportional spacing. Standard friction feed and optional tractor. Paper width 13.5 inches. Standard Centronics optional RS-232C. Built with 6K text buffer expandable to 32K buffer. **£289.00**

BROTHER HR 20

The new Brother Daisywheel HR 20 8K standard buffer upgradable to 16k. Comes standard with serial and parallel port **£389.00**

JUKI Daisywheel

Juki 6100 **£329.00**

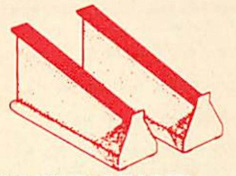
NEW MP26 Daisywheel

MP26 A feature rich very quiet printer. Universal compatibility with almost al personal computers at an unbeatable price. Speed: 26 cps. 132 columns Diablo 630 compatible **£249.00**

Optional Tractorfeed	**£95.00**
Optional Sheet feeder	**£145.00**

MP40

A very fast, quiet printer with features and compaible with virtually all computers at a fantastic price. 40 cps, 132 column, diablo 630 interfacew, parallel interface, built in standard RS232 optional £355.00



PRINTER STAND

Fits nearly any width of printer. Allows paper storage and gives ideal viewing position. Can also be used for computers and monitors. Steel construction prevents bending or buckling **£18.00**

How to Order

You can purchase any of the items listed. All you have to do is write your requirements on a sheet of paper, and we will despatch your goods within 24 hours, subject to availability. Please add the following amounts for Postage and Packing.

Items below £10.00	add **£1.50**
Items below £50.00	add **£2.50**
Items below £100.00	add **£3.50**
Items over £100.00	add **£8.00**

(UK Mainland only)

All prices include VAT at 15%
Prices correct at time of going to press but subject to change without notice

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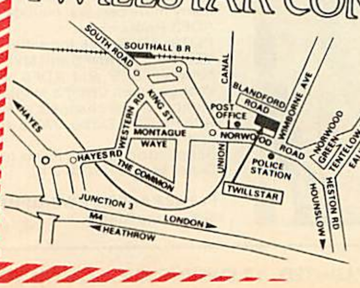
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SOLIDISK MASTE

Solidisk Technology

If you want to upgrade your BBC B to a Master, why not use our MASTERPLAN? We buy in your Beeb and sell you a brand new MASTER: you pay only the difference.
Fill in the blanks below to help you cost the project:

Acorn Master 128K, brand new cost 499.00

BBC Model B, issue ...., trade-in worth (issue 2 = £131, 3 = £191, 4 = £187, 7 = £225) ☐
DFS, memory and other add-ons, trade-in (We accept only Solidisk and Acorn add-ons Reging for valuation) ☐
Total cost of MASTERPLAN project ☐

Masterising

If you are not yet ready to upgrade to a Master, why not Masterise? All you have to do is add Shadow Ram, Sideways Ram, the Real Time Clock and ADFS disk filing system — all available from Solidisk at good prices. You do not have to purchase them all of course, and they will not turn your Beeb into a Master (no numeric keypad or Rom slot, for example), but all the essential features are there and the solution could be well worth your while.

Real time Clock, Yes: £29, No: nil ☐

1770-DDFS plus ADFS, Yes: £55, No: nil ☐

DFDC plus ADFS, Yes: £60.00, No: nil ☐

(Twomeg) 128K RAM, Yes: £60.00, No: nil (other options include Twomeg 32, Twomeg 256, Fourmeg 32 and Fourmeg 256) ☐
Total cost of MASTERISING project ☐

Solidisk Real Time Clock:

The Real Time Clock and Calendar (RTC) can be plugged into any ROM socket on the Beeb with absolutely no other connection to make. It is powered by a rechargeable NICAD battery which should keep the RTC active throughout the Summer holidays.
Star commands include: Alarm, Bell, Boot, Configure, Dalarm, Noclock, Roms, RTC, Settime, Show, Status, Time and Unplug. FX161 and 162, Osword 14 and 15 are similar to the Master 128. It is also compatible with Basic 4's TIME$.
The RTC has many of the autoconfigure features of the MASTER with the same command syntax: Caps/Nocaps, data, delay, Fdrive, File, Ignore, Lang, Loud/Quiet, Mode (0-135), Boot/Noboot, Dir/Nodir, Time/Notime, Printer, Repeat, Rx, Scroll, Tube, Tv, Tx. If your Beeb has an AMX mouse, the RTC offers a DESKTOP and a CALCULATOR, just like GEM!

Order as RTC £29.00

Solidisk Dual Density Disc Systems:

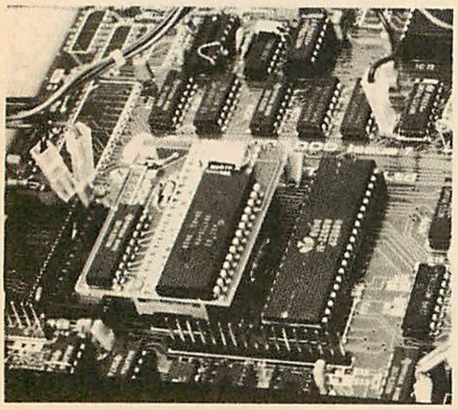
Solidisk offers two types of disk filing system, with a choice of two Rom types. Both are based on the Western Digital WD1770 chip — the standard not only for the BBC model B, but also the BBC +, Master, Compact and ADFS. Both are fully compatible with Acorn Roms, offering complete solutions to the problems of updating the BBC, based on 1770, 8271, DFS and ADFS systems.
Not only is our range therefore unequalled, but also the features it offers; if you don't believe us, check other makes before you buy.

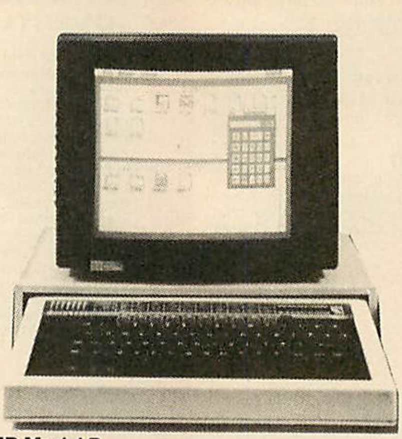
Which DFS?

WD-1770 DDFS Disk Interface:

If your Beeb has not yet been upgraded to disc, then the DDFS is the right choice. It is certainly the most popular version on the Beeb and easy to fit. Use with Acorn or Solidisk Roms to give compatibility with any 40/80 track drive, with or without PSU.

New low price without Rom £35.00
With STL 2.2 ROM (see below) £45.00
With STL 2.1 ROMs (see below) £55.00



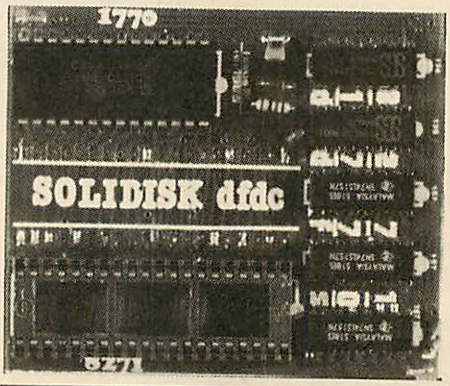


BEEB Model B

WD-1770+8271 DFDC Disk Interface:

If you already have an 8271 based DFS from Acorn, Watford Electronics, Pace, Cumana or Viglen, this is the only way to add the WD-1770 to your system. Fully compatible with the Acorn DNFS1.20 ROM for the 8271 and Acorn ADFS for the 1770. Allows the Acorn chip set to self-erase, keeping memory requirements (and PAGE) at a minimum. For maximum performance, use the STL 2.2 Rom (for both 8271 and 1770). If ADFS is required, use Acorn DNFS1.20 ROM (for your 8271) with the STL 2.1 Romset (for the WD-1770). The last combination will still allow self erasure, and will add single and double density, cross format file copy, ADFS as well as NFS. In other words, everything imaginable with the Beeb.

New low cost DFDC without Rom £40.00
DFDC with STL 2.2 Rom £50.00
Special offers:
DFDC with STL ADFS 2.1 Romset (see below) £55.00
DFDC with STL 2.2 DFS and 2.1 (3 Roms) £63.00



Which ROMs from Solidisk?

STL DFS 2.2 ROM:

Runs with both 8271 and WD-1770 chips from Acorn, Watford and Opus, and 1770 from STL, and offers the following features:
★ 40/80 track software switching ★ unlimited catalogue entries ★ automatic Read after Write for media security ★ runs with Z80, 6502 and Econet ★ more commands than any other DFS including FORMAT in 40/80 track, VERIFY, DZAP, MZAP, RECOVER, RESTORE, WORD, RTRACK, WTRACK, DSTEP, ETC ★ when used with the WD-1770, reads disks in single and double density and IBM format ★ 60 per cent free extra storage space in double density (640K per disk compared with Acorn's 400K) ★ more speed and bigger file size.
Supplied on one 16K Rom with manual

Order as the DFSR2 .... £20.00

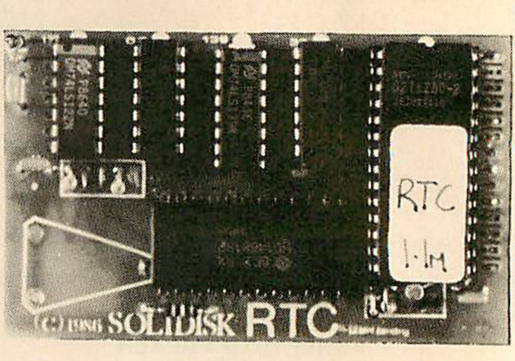
PLEASE SPECIFY WE/OPUS/MASTER/COMPACT as applicable.

The ADFS 2.1 ROMSET:

This double ROM set has all the commands of the STL DFS 2.2 Rom but runs ony with the 1770, not the 8271 system. It has many more besides, including all the commands in the Acorn ADFS Rom.
PLUS: ADFS disk formatter (for 40, 80 and 160 tracks) and VERIFY ★ MVADFS and MVDFS to transfer cross format disks between DFS and ADFS with automatic PAUSE for disk change when using a single drive ★ user specified (1 to 10) number of file channels to keep PAGE to a minimum ★ runs with the Z80, Turbo, 32016 and the new 80186 PC compatible upgrade.
Supplied on two 16K Roms or one 32K with two user manuals

Order as ADFSROM 2.1 .... £30.00

PLEASE SPECIFY WE/OPUS/MASTER/COMPACT/16K OR 32K as applicable.

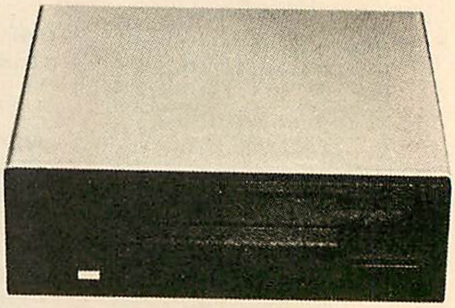


Real Time Clock

Solidisk FD35 3.5″ Disc Drive:

This is a superb 80 track, double sided, dual density drive, also useable on the ATARI ST. You get up to 640K maximum per disc (800K with the 80186) and at its price, you are guaranteed of extremely good value. Comes with demo disk.

Order as FD35, single drive £100.00
Order as TFD35, twin drive £200.00
Order as ADFS16 for the Compact £113.85
Separate PSU if required (PSU/35) £25.00
Recommended media:
Sony Double Sided, double density, 135 TPI or equivalent (£29 per box of 10).



Solidisk FD525 5.25″ Disc Drive:

This is a superb 80 track, double sided, dual density drive and very fast. You get up to 640K maximum per disc (800K with the 80186 board), 40/80 manual switch is optional as most Acorn DFS ROMs and Solidisk's have automatic 40/80 track software switch.

Order as DF525, single £119.00
Order as TFD525, twin in a bridge £228.00
Orders as TFD525/CPU, twin in the CPU case with detachable keyboard case for Beeb £239.00
Separate PSU if required (PSU/525) £25.00
40/80 track manual switch optional £2.00

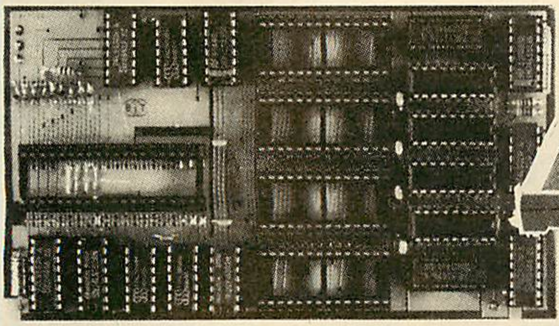
PLEASE SPECIFY SWITCH/MASTER/COMPACT/ ELECTRON if applicable.



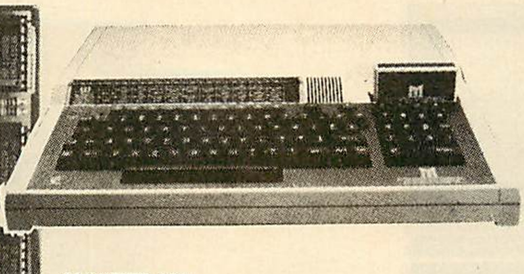
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RISE YOUR BEEB!

Solidisk Technology



TWOMEG 128



MASTER 128

New: The Twomeg 128K board

Solidisk has always been closest to emulate the MASTER 128K.
The Twomeg 128K features 64K of Sideways RAM in four banks: 4, 5, 6 and 7, selected by a single latch at &FE30 for both read and write exactly like the Master. The remaining 64K is more versatile and can be used as four more Sideways RAM (12, 13, 14 and 15) or as Shadow RAM and a 24K printer buffer (good news for wordprocessor users).

The new Twomeg 128K will run Computer Concepts Interword, Sheet and Spellmaster, Acorn View 3.1, Viewsheet, Viewstore, Basic etc.
A clever switch write-protects only the 8 banks of Sideways RAM without affecting the Shadow RAM and the Printer Buffer.
Ramdisk is not forgotten, you can have one in ADFS (if you have Solidisk ADFS) or in DFS for both 8271 and 1770 disc controllers.
Four extra ROM sockets are available directly on the Twomeg 128K board, numbered 8, 9, 10 and 11. Four ROM sockets on the Beeb are renumbered to 0, 1, 2 and 3.
Software is supplied on FIVE discs, containing Wordprocessor, Spelling Checker, Database, Macro Basic, Ramdisk, Menu, Manager etc. Software Pack 2 (five discs) is optional and contains many useful utilities for the machine code programmer. Software Pack 3 also optional, contains around 50 of Solidisk Megagames. List of all programs in these software packs is included in the Twomeg 128K User Manual.
Fitting is extremely easy: just plug in the board into the CPU socket and push 3 terminals onto S20, S21 and S22. Internal logic produces chip select for the &FE30 latch. Free installation by local experts is available.
Order as 2MEG128 .... £60.00

PLEASE SPECIFY /40 TRACK OR /80 TRACK FOR THE SOFTWARE PACK 1, included in the price.
Optional software Pack 2 or 3 (five discs) £10.00

Detachable Keyboard and CPU case:

This 'three box' casing system will help you to organise your desk and improve comfort. The keyboard features the lowest profile (maximum height of any key is 47mm) and does not skid. Typing angle is 2-3 degrees better. The monitor sits on top of the computer. Pure metal construction provides EMF shielding against phantom keyboard interrupt and accelerates heat dissipation (no messy metal strengthening over plastic). Keyboard lead is 24" long.
Order as K/CPU case, special offer price while stocks last £25.00
Note:
Post and packing £6.00



The Fourmeg 32K board:

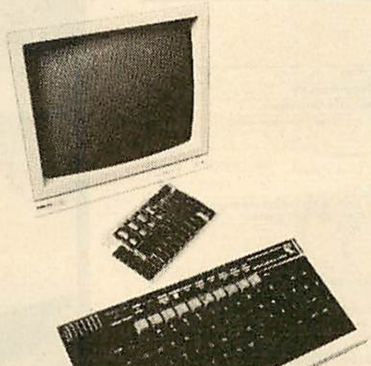
The Fourmeg 32 is a ROM expansion board on its own with up to 224K of installable firmware. It also is the FASTEST shadow RAM board around (it runs at 4 MHz while others run at 2 MHz, including the MASTER), and the fastest Sideways RAM board. It consumes also less power than any other ROM RAM board through the extensive use of CMOS devices.
The top row of five ROM sockets will take software ROMs, up to 32K each, such as used on the Beeb Plus, the MASTER or the Compact. They are high speed sockets.
The middle row contains 40K of high speed CMOS static RAM chips, acting as a Shadow RAM and a printer buffer or as two banks of Sideways RAM. Write-protection of Sideways RAM is performed by separate Read and Write registers with automatic write-protect when one presses the BREAK key.
The CPU is a 4 MHz, CMOS technology, GTE 65C02, similar to the one on the Turbo board, replacing the existing 6502.
The Fourmeg 32K is also upgradable, once more by the latest CMOS technology: 62256, 32k RAM on a single chip which plugs into one of the high speed ROM sockets.

This board is designed such that one can have everything required on a single, compact and easy to install unit. All the necessary software is in a MANAGER ROM (supplied). Star commands include: Shadow, Ramdisk, Ramoff, Ramdfs, Ramadfs, Ramdrive, Testram, Plus. A complete toolkit to assist programming in Basic is also included: Hardbreak, Join, Keyload, Keysave, Kill, Lvar, Menu, Msearch, Mzap, Page, Printer, Rcat, Number, Report, Rload, Rwipe, Salvage, Status, Sound. One year guarantee.

Order as FOURMEG 32 .... £70.00
Additional 32K chip (optional) £15.00
Software packs 1 to 3 (optional), each of five disc £10.00

The Fourmeg 256K board:

The Solidisk Fourmeg 256 board combines high CPU speed (4MHz GTE 65C02) with large memor size (256K Dynamic RAM, 8K static RAM) and powerful supporting software (32K MANAGER ROM). It offers four ROM sockets featuring high speed and high capacity (up to 64K ROM per socket), 8 shadow RAM banks, 8 Sideways RAM banks or even both.
Order as Fourmeg 256K £135.00
NOTE: NO MORE ROM BOARD TRADE-IN IS ALLOWED AFTER 1ST MAY 87.



Wordwise Plus or Interword Special Deal:

If you buy Wordwise Plus or Interword together with a Twomeg or a Fourmeg board, you get extra special discount!
Wordwise Plus (bundle only) £30.00
Interword (bundle only) £50.00

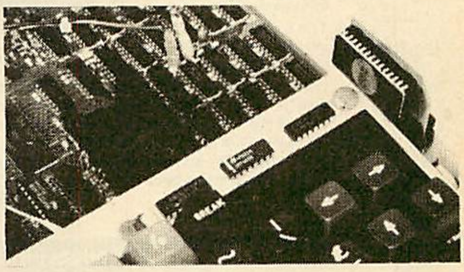
Special Offers on Sideways RAM boards:

These exceedingly popular systems (40,000 plus units sold) enables the Beeb users to load ROM images into the Beeb, make a 16K printer buffer, use DFS with PAGE at &E00, play Solidisk Megagames, bigger Basic (Vstore), store music and inumerable other uses as supported by a library of 15 software diskettes.
They consist of a base unit plugging into the rightmost ROM socket on the Beeb and an exchangeable RAM card with capacity ranging from 32K (two Sideways RAM banks) to 128K (8 Sideways RAM banks). They are now made available to you at less than half their normal price, all offering extremely good value. One year guarantee, supplied with User Manual and one software disc.

SWR32, 32K RAM, disc No 1 .... £20.00
SWR64, 64K ROM and two 16/32K ROM sockets, Disc NoI £30.00
96K Extension for SWR 32 .... £25.00
SWR128 (new style), 128K RAM, two 16/32 ROM sockets £45.00
Software Packs 1 to 3, each of five discs, any pack £10.00
Any disc volume 1 to 15 each £2.00

PLEASE SPECIFY /40 TRACK OR /80 TRACK as applicable.

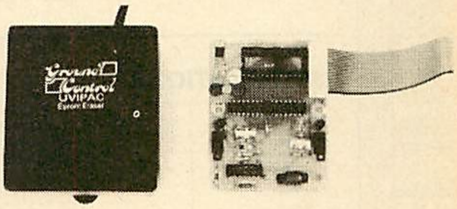
Electron Disc Interface: £50.00
BABT approved Modem plus Linemaster ROM £30.00



EPROM Programmer:

The UVIPROM is the cheapest Eprom programmer on the market yet the easiest to use, will program 2764 EPROMS in one minute and 27128 in two minutes.
A different version called the UVIPROM32 will program 27256 EPROMS in 4 minutes.
The MULTIPROM is the Deluxe version, combining the capacity of the UVIPROM and the UVIPROM32 and some other features. Use it to program 2764, 27128 (normal and A type), 27256 (12.5V and 21V), 27512, 27513 etc. Textool 28 pin ZIP socket fitted as standard.

UVIPROM plus disc No 10 .... £20.00
UVIPROM32 plus disc No 10 .... £20.00
MULTIPROM plus disc No 10 .... £44.50
UVIPAC Eprom Eraser £20.00
2764 EPROM each £2.00, ten for £16.00
27128 EPROM each £4.00, ten for £34.00
27256 EPROM each £7.00, ten for £63.00
Panasonic KX-P1081 Special Offer: .... £149.00 + VAT



IMPORTANT NOTICE: TRADE-UP

Solidisk will accept return of memory boards up to ONE YEAR old for TRADING-UP. The selling price (below) is the price we sell the same goods at the time of the trade-up transaction.

Age	Trade-up allowance
Up to 3 months	90% of selling price
Up to 6 months	85% of selling price
Up to 9 months	80% of selling price
Up to 12 months	75% of selling price

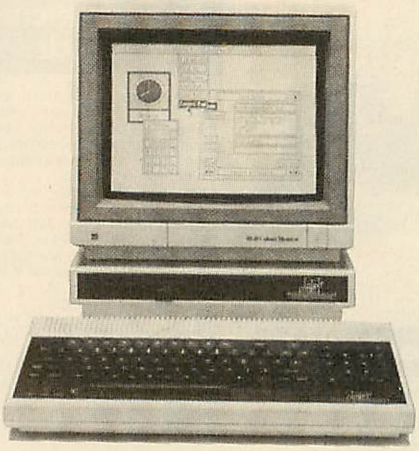
If the balance of the upgrade is less than £15, a minimum charge of 15 is made.

****
As a result of our MASTERPLAN, we have a number of BBC Model B's for sale every day. All are fully inspected, reconditioned if necessary, and guaranteed. All have a new DDFS fitted as standard. We also buy second-hand Beeb for cash. See our price list for details.
****

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

NEW BRANCH IN BRISTOL OFFICIAL DEALER IN AVON

System One



System One: COMPACT now with 5.25" drives:

The System One consists of a Master Compact 128K, twin disc drives, optional monochrome or colour monitor, optional printer. Solidisk will give you free our own CDFS 2.1 ROM, a Dual Density Beeb Disc Filing System featuring disc sector editor (for both DFS and ADFS discs), MVDFS and MVADFS for cross format file transfer, disc formatter and verifier etc. Some of the options include 5.25" drive(s) which we believe is a better choice than the 3.5" format. The 5.25" format is still preferred for the Master 128 (even now, with 80186 board) and on the Beeb. Cheap discs, better reliability, better software availability are some of the key advantages. Don't buy single drive systems because you can't make copy ADFS discs with a single drive.

Available options (all prices include VAT):

A — Compact 128K with Acorn 14" Colour monitor, CDFS, twin 3.5" drive, one demo disc containing Solidisk Database, Spelling Checker and Megagames (as illustrated): *£749.00*
B — as above but with one 3.5" drive and one 3.5" drive and one 5.25" drive: *£748.00*
C — as above but with twin 5.25" drives in a bridge unit: *£759.00*

Monochrome Option:

All systems above (A, B or C) can be supplied with Acorn 12" monochrome monitor in place of the Colour monitor:-
A *£598.00*
B *£597.00*
C *£608.00*

P-1081 Printer option: £171.45

Buy the Panasonic KX.P1081 NLQ/Super NLQ printer with a System One. At £171.45, you just can't afford to let this latest Japanese printer go. Special reduced price at only .... *£149.00 + VAT.*

SPECIFICATIONS

Print Method	Impact Dot Matrix
Print Speed (cps)	Draft 120 NLQ 24 Compressed 102
Print Mode Selector	Standard/Program, Near-letter quality, Compressed
Print Direction	Bi-directional with logic seeking (Uni-directional in bit image mode)
Print Head	9 pin
Print Head Life	100 million characters
Line Spacing	1/6", 1/8", 7/72", n/72", n/216" (programmable)
Line Feed Speed	100 ms (per 1/6")
Character Set	Full 96 ASCII characters with descenders, Italic, 32 International characters (11 Countries), IBM* special characters, IBM block grapbics
Character Structure Draft NLQ Block graphics	HOR × VERT 9 × 9 18 × 18 6 × 12
Bit Images (Dots/inch)	60, 72, 80, 90, 120, 240 (120 can be used in standard or double speed)
Printing Sizes Draft/NLQ Double width Proportional Spacing	Characters per inch: Pica / Elite / Semi-Comp / Comp 10 / 12 / 15 / 17.1 5 / 6 / 7.5 / 8.5 Variable Characters per line: Pica / Elite / Semi-Comp / Comp 80 / 96 / 120 / 137 40 / 48 / 60 / 68 Variable
Paper Feed	Adjustable rear tractor feed and friction feed
Paper Width	Fanfold paper: 3" to 10" Single sheet: 4" to 9"
Number of Copies	3 (Original plus 2 non-carbon copies)
Interfaces Standard Optional	8 bit parallel RS-232C (DTR, X-ON/X-OFF or ETX/ACK···KX-P11D; DTR, X-ON/X-OFF···KX-P17)
Buffer Standard Optional	1 K text buffer 4 K text buffer (KX-P12)
Compatibility	RX-80™, IBM Matrix and Graphics Printers (Elite Pitch command of the Proprinter is also available.)
Noise Level	60 dbA
Reliability	MTBF 4000 hours at 25% duty (not including head life)
Environmental Conditions (Controlled)	Operating: 41°F to 104°F (5°C to 40°C)/20 to 80% humidity Storage: −4°F to 140°F (−20°C to 60°C)/10 to 90% humidity
Power Requirement	240 V AC ±10% 50 Hz 0.6 AMP
Dimensions (W×D×H)	15.9" (403 mm)×11.3" (286 mm)×4.5" (115 mm)
Weight	13.4 lbs. (6.1 kg)
Other Options	Color ribbons: Brown (KX-P111), Blue (KX-P112), Red (KX-P113)

*RX-80 is a trademark of Epson America, Inc.
*IBM is a registered trademark of International Business Machines Corp.

System Two



System Two: MASTER 12K with Twin 5.25" Drives in a Bridge Unit:

This system is our most popular, consisting of a fully blown MASTER 128K, twin 80 track, double sided 1.3 Megabyte Disc Drives in a bridge unit doubling as a monitor stand, free demo disc containing Solidisk Database, Spelling Checker and Megagames.

Available options (all prices include VAT):
A — As illustrated (without monitor) *£670.00*
B — with Philips 14" CM 8533 colour monitor (same construction as Acorn colour monitor) *£865.00*
C — with Mitsubishi 14" XC 1404 colour monitor *£830.00*

Special offers (if bought together with a System Two):
MP-165 .... *£220.00*
P-1081 .... *£171.45*
Master 80186, 512K Co-processor *£223.00*
Acorn 20 MB Winchester .... *POA*
Solidisk 20 MB Winchester (special issue, only with 80186 option) *£500.00*

MP-165 Printer option: £220.00

The MP 165 is one of our best selling printers, featuring 165 cps in draft mode, 40-50 cps in NLQ, Epson FX compatibility, friction and tractor feed etc. Normal price is extremely attractive at £260.00 when you consider that the MP 165 is a lot faster than its rivals such as the Star NL-10, the Kaga KP-810, the EPSON LX86 or FX85 etc. We will cut £40 off the normal price and give you a free printer lead if you buy the MP-165 together with a System.

Special Offer £179.99



FREE 2M LEAD! ONLY FROM SOLIDISK

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

MASTER SERIES:

AMB15	Master 128	499.00
ADB12	Master ET	399.00
ADC06	Turbo Upgrade	125
ADC08	80126/512K	228.00
ADF13	Eprom cartridge	14.95

MANUALS AND DOCUMENTATION:

ADJ22	Ref manual Pt 1	14.95
ADJ23	Ref manual Pt 2	14.95

MASTER COMPACT SERIES:

ADB20	Master Compact Single drive	441.25
ADB20+ADF30	Master Compact S/D with TV mod.	457.35
ADB20+ADF31	Master Compact S/D with Mono monitor	537.85
ADB20+ADF32	Master Compact S/D with Colour monitor	687.35
ADF15	RS232 kit	29.90
ADF16	Second 3.5" floppy drive	113.85
ADF17	PAL TV Adaptor	29.90

ACORN SOFTWARE:

SUB27	Viewstore database ROM	59.80
SUB18	Pascal	69.00
	FORTH	19.90
	LISP	19.90
	MICRO-PROLOG	79.95

SOLIDISK SOFTWARE ROMS:

PCFS	Compatible with PC and MS DOS discs	15.00
PCMAN	MANUAL FOR PCFS	5.00
CDFS	single and double density DFS ROM for the COMPACT	10.00
MADFS	DFS and ADFS ROM (32k) for the Master	20.00
LMS	communication ROM for the Master	10.00
SOLIMON	Machine code monitor for Master/Compact	10.00
INSIGHT	Intelligent disassembler, XREF	20.00
UVP	Eprom programmer software (8k)	5.00

ECONET PRODUCTS:

ADF10	Econet plug-in	49.99
AEH17	100m Cable	99.00
AEH18	10station lead set	29.00
AEH19	Econet starter kit	99.00
AEH20	Econet bridge	199.00
AEH21	Econet socket kit	29.95
AES21	Level 2 Fileserver	249.00
AES22	Printer server ROM	49.00

DISC DRIVES:

FD35	3.5" 80-track double-sided single drive	£100.00
TWIN35	Twin DF35	£200.00
FD525	5.25" 80-track double-sided single drive	£115.00
TWIN525	Twin FD525	£230.00
20MB	Winchester new model, low cost SEAGATE	£700.00

PRINTERS:

LX86	EPSON LX86 + 2M printer lead	249.00
LXTF	LX80 Tractor Feed	31.30
LXCSF	LX80 Cut Sheet Feeder	53.53
FX85	EPSON FX85 NLQ + 2M printer lead	350.00
FXTF	FX85 Tractor Feed	30.59
FXCSF	FX85 Cut Sheet Feeder	123.50
NL10	STAR 80 col-120 cps par. 2M lead	289.00
NLCSF	Cut Sheet Feeder for NL-10	59.99
NLRIB	Black Ribbon for NL 10	5.64
MP165	Tractor and pich feed, 165 cps, NLQ, 2M printer lead, exceptional value	260.00
EPSRIB	Black ribbon for Epson and MP165	4.00
J6100	JUKI 6100 Daisy Wheel + 2M printer lead	340.00
JURIB	JUKI 6100 black vinyl printer ribbon	2.00
PAPER	2000 sheets cont. paper, A4 size 11" x 9.5"	14.00

MONITORS:

BM7502	12" Philips hi-res green screen, lead	85.00
BM7522	12" Philips hi-res amber screen, lead	86.00
CM8533	14" hi-res Colour Monitor, lead	299.00
TAXAN3	12" TAXAN Supervision 3, hi-res RGB Colour, lead	375.00
TAXAN2	12" TAXAN Supervision 2, Merdium-res RGB Colour monitor, lead	315.00
XC1404	14" Mitsubishi RGB colour monitor, lead	260.00

SOFTWARE PACKS:

SWPK1	5 software discs, 80 track. Database, spelling checker, machine code monitor, Macro Basic etc. 5.25" format	£10.00
	3.5" format	£15.00
SWPK2	5 software discs, 80 track. Games. 5.25" format	£10.00
	3.5" format	£15.00

DISKETTES:

MD525	5¼" low cost VEREX for all drives	12.00
MD557	5¼" hi-rel MD557, Verbatim DSDD 96tpi	25.00
C102	3.5" low cost Verbatim for all drives	20.00
C103	3.5" hi-rel 90097M Vertbatim DSDD 135 tpi	28.00
C104	3" CF2/MSOFT for all Amstrad drives	39.00

CARTRIDGES:

ADF13	Acorn Eprom cartridge for two 27128	14.95
EPR32	Solidisk Eprom cartridge for one 27256	8.00
RAM32	Solidisk 32K RAM cartridge with battery backup and write protect switch	25.00
MEGA256	Solidisk 256K Mega-RAM card with RAM disc and printer buffer in ROM	100.00
MEGA256	Solidisk 1 Megabyte Mega-RAM card with RAM disc and printer buffer in ROM	POA
	Expected price in April/May	225.00

EXTRA DISCOUNT

If you buy a disc drive or a printer or a monitor at the same time you buy a Master or a Compact, you are qualified for SYSTEM DISCOUNT and a free Software Pack 1 (worth £10.00 or more).

Normal Package Price	System Discount	Reduction
£600-£699	3%	£18-£21
£700-£799	4%	£28-£32
£800-£899	5%	£40-£45
£900-£999	6%	£54-£60
£1000 and above	7%	£70-£££

Example of system		normal price	Discount	Net price
1	Compact Mono + MP165 printer	797.85	31.95	765.94
2	Compact Colour + Juki 6100	1027.35	71.89	955.11
3	Master 128 + twin F/Drives	729.00	29.16	699.84
4	Master 128, twin F/Drives, CM8533 Colour monitor	1028.00	71.96	956.04
5	example 4 + MP165 printer	1288.00	90.15	1197-84
6	Master 512 + twin F/Drives	957.00	57.42	899.58
7	Master 512 + twin F/Drives, plus 20 MB Winchester	1657.00	115.99	1541.01

SECONDHAND BEEB AND UPGRADE TO MASTER:

We buy and sell good condition second hand Beebs, even by post. Proof of original purchase is required if you are only selling your computer. Reduced commission is available if you are UPGRADING your BBC to a Master, ask for a MASTERPLAN quotation.

BBC Model	we buy at	we sell at
B-issue 2	131	175
B-issue 3	191	225
B-issue 4	187	250
B-issue 7	225	300

The prices above are given as average for very clean and good condition machines. Please ring for stock allocation before you call.

ORDERING BY POST:

All items can be ordered by post, sending the coupon below and enclosing cheques, POs, drafts or credit card numbers or by phone. P and P is charged as follows:
Less than 1 KG (eg software, cartridges and books): **£2.00**
Up to 3 KGs (eg single disc drives): **£3.00**
Up to 10 KGs (eg computer, monitors, printers, twin disc drives): you can specify either parcel post £6.00 or courrier/Datapost: **£12.00.**
Above 10KGs (eg complete system), please either allow generously or give us a ring for quotation.

ORDER FORM

Please fill and send to:
Solidisk Technology Ltd
17 Sweyne Avenue
Southend-on-Sea, Essex SS2 6JQ

Name: ....

Address: ....

....

....

Items: ....

Price: .... P & P: £2/£3/£6/£12

Total: ....

Access/Barclay:

Solidisk Technology Limited, 17 Sweyne Ave, Southend-on-Sea, Essex SS2 6JQ. Tel: Southend (0702) 354674 (16 lines).

OFFICIAL DEALERS IN ESSEX

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE
17 Burnley Road, London NW10 1ED Tel: 01-208 1177
305 Edgware Road, London W2 Tel: 01-723 0233

BBC MASTER SERIES

AMB15 MASTER (see page 6 for details of bundled software included in the price) — £395 (a)
AMB12 MASTER ET — £315 (a)
AMCO6 Turbo 65C02 Module — £99 (b)
ADC08 512 Processor — £195 (b)

ADF14 ROM Cartridge	£13(d)	ADJ23 Ref Manual Part II	£14(c)
ADF10 Econet Module	£41(c)		
ADJ22 Ref Manual Part 1	£14(c)	ADJ24 Adv Ref Manual	£19.50(c)
BBC Master Dust Cover	£4.75(d)	View User Guide	£10(d)
		Viewsheet User Guide	£10(d)

MASTER ROM/RAM CARTRIDGES

TRC1 Two rom cartridge — £8.95 (d)
TRC4 Four rom cartridge — £11.95 (d)
TRC 32K Cartridge inc RAM — £29.95 (d)

BBC MASTER COMPACT

See page 6 for free bundled software

SYSTEM 1
128K, Single 640K Drive & bundled software. — £385 (a)

SYSTEM 2
System 1 with a 12" Hi Res Monochrome Monitor. — £469 (a)

SYSTEM 3
System 1 with a 14" Med Res RGB Monitor. — £599 (a)

Second Drive Kit. — £99 (c)
Serial Kit. — £29 (d)
T.V. Modulator — £29 (d)
Extension cable for external 5.25" 80T Drive. — £12.50 (d)
Mertec Adaptor (Upgrades to almost master level) — £35 (c)

UPGRADE KITS

1.2 OS ROM	£15 (d)	ADFS ROM	£26 (d)
DNFS ROM	£17.50 (d)	1770 DFS Kit	£43.50 (d)
BASIC II ROM	£22.50 (d)	Econet Kit	£55 (d)

ECONET ACCESSORIES

Econet Starter Kit	£85 (b)	Econet Bridge	£174 (b)
Econet Socket Set	£29 (c)	Printer Server Rom	£41 (d)
File Server Level II	£75 (b)	10 Station Lead Set	£26 (d)
Master FS Utility Disc	£17.25 (d)		

ACW/CO-PROCESSOR

For full specification see page 5
32016 Co-processor — £999 (a)
Cambridge Workstation — £3450 (a)
X25 Gateway — £2175 (b)

PANOS/PANDORA Upgrade incl 32000 BASIC FP. — £29 (d)
Co-Processor upgrade to 10 MHz operation for faster processing. — £POA (d)
Time Warp Real Time Clock with utilities for reading time and date in PANOS (for model B and B+ users). — £39 (c)
32016 Instruction Set Manual. — £25 (c)

WINCHESTER DRIVES

P20HD TECHNOMATIC 20 Mbyte Winchester Drive including Acorn ADFS ROM — £599 (a)

P10HD TECHNOMATIC 10 Mbyte Winchester Drive. Fully compatible with Acorn ADFS **Special offer** — £399 (a)

P204HP TECHNOMATIC 20 Mbyte Winchester and a 80T DS floppy Drive built in a monitor stand. Includes ADFS Rom. — £849 (a)

P2041HT As P204HP but also with a 10 Mbyte tape streamer backup unit and backup utilities. Includes ADFS Rom. — £1,499 (a)

TS10 10 Mbyte Tape Streamer Backup unit with utilities. — £695 (a)

TFC10 10 Mbyte Pre-formatted Cartridge for use with P2041HT and TS10. — £19 (d)

Enquire for larger capacity Winchesters. These Winchesters are compatible with the S.J. File Server. Special adaptor for S.J. File Server — £28 (d)

WINCHESTER Drive Multiplexer
TWM2 for two computers. — £99 (b)
TWM4 for four Computers. — £159 (b)

Details on Technomatic Winchesters on page 6

SECOND PROCESSORS

Universal 2nd Processor Adaptor — £75 (b)
TORCH ZEP100 — £229 (a)
MULTIFORM Z80
TECHNOMATICs multi format Z80 system includes a FREE Pocket Wordstar + MS/DOS Read/Write Utility — £289 (b)

ACORN IEEE INTERFACE

Allows BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard. The interface can link upto 14 compatible devices. Typical applications are in experimental work in academic and industrial labs. — £265 (a)

TELETEXT ADAPTOR

Converts your computer into a teletext receiver. — £75 (b)
BBC Publications rom for enhanced Teletext Utilities. — £7.95 (d)

PRINTERS

EPSON LX800
150 cps, variety of fonts, including NLQ, bit image graphics, IBM char/graphics compatible, centronics interface and tractor feed as standard — £229 (a)

EPSON FX800
An enhanced version of FX85. Call for details. — £329 (a)

EPSON FX1000
An enhanced version of FX105. Call for details. — £449 (a)

EPSON EX800
See details on page 5. — £409 (a)
Colour option for EX800/EX1000. — £59 (b)

EPSON LQ800
See details on page 5. — £439 (a)

EPSON LQ1000
As LQ800 but wider carriage for 136 columns. — £589 (a)

TAXAN KP815
Enhanced KP810 with 160cps and full IBM compatibility. — £269 (a)

TAXAN KP915
Enhanced KP910 with 180cps and full IBM compatibility. — £369 (a)

NATIONAL PANASONIC KX P1081 — £169 (a)
STAR NL 10 (Parallel Interface) — £209 (a)
STAR NL 10 (Serial Interface) — £279 (a)

INTEGREX Multicolour Inkjet printer. — £549 (a)
Ideally suited for high res colour VDU screen dumps. Quiteness & consistent output are major characteristics. — £525 (a)
BBC Screen dump for Integrex. — £15 (d)

BROTHER HR20
A new attractively styled printer from Brother with unusually quiet operation, host of new fatures, including option to copy current documents. 8K buffer standard expandable to 16K. Parallel & Serial ports as standard. — £349 (a)

NAT PANASONIC KX P3131
Daisy wheel printer with 38K buffer, 17 cps, bi-directional, parallel interface — £249 (a)

JUKI 6100 Daisy wheel printer
15 cps, 2K buffer, switchable 10/12/15 cpi proportional spacing, underlining. Parallel interface. — £319 (a)

PLOTTERS

HITACHI 672 — £479 (a)
GRAPHICS WORKSTATION — £599 (a)
LINEAR GRAPHICS
Full range of accessories available for plotmate plotters
A4S PLOTMATE — £370 (a)
A4SM PLOTMATE — £450 (a)
A3M PLOTMATE — £569 (a)

(Enquire re educational prices for the Linear Graphics plotters)

Parallel Printer Lead (1.2m). — £6 (d)
Serial Printer Lead (1.2m). — £7 (d)

PRINTER SHARERS & BUFFERS

BUFFALO PB Buffer
Parallel buffer for internal fitting to most Epson printers. Simple to instal.
PB128 (128K) — £99 (c)

PERIPHERAL & COMPUTER SHARERS
High quality switches to allow the user to switch between computers, printers, modems etc. Fully shielded metal cases. all lines fully switched.

		Parallel		Serial
2 Computers to 1 Printer	36v36-2	£45(c)	25v25-2	£45(c)
3 Computers to 1 Printer	36v36-3	£69(c)	25v25-3	£65(c)
4 Computers to 1 Printer	36v36-4	£85(c)	25v25-4	£75(c)
2 Computers 2 Printers X-over	36v36-x	£69(c)	25v25-x	£65(c)
BBC Cable set 3 to 1 (1m ea)		£32(d)		£34(c)
BBC Cable set 4 to 1 (1m ea)		£39(d)		£41(c)

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable — £22 (c)

Paper & Labels
Plain fanfold paper with microperforation:
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1000 sheets A4 — £12.50 (£3.50)

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Triple Row 2 7/16" × 1 7/16" — £5 (d)

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(24 hr viewdata system)
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Tel:01-208 1177 Telex:922800
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West End Branch
305 Edgware Road, London W2
Tel:01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Acess Card

Orders welcome from government depts & educational establishments

All prices ex VAT.
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

DISC DRIVES

All floppy drives carry a two year warranty

5.25″ Single Drives 40/80 switchable:	
TS400 400K/640K	£114 (b)
PS400 400K/640K with integral mains power supply	£129 (b)
5.25″ Dual Drives 40/80 switchable:	
TD800 800K/128OK	£199 (a)
PD800 800K/1280K with integral mains power supply	£229 (a)
PD800P 800K/1280K with integral mainspower supply and monitor stand	£249 (a)
3.5″ 80T DS Drives:	
TS351 single 400K/640K	£75 (b)
PS351 single 400K/640K with integral mains power supply	£119 (b)
TD352 Dual 800K/1280K	£135 (b)
PD352 Dual 800K/1280K with integral mains power supply	£187 (b)
PD853 Combo Dual 5.25″/3.5″ drive with psu.	£229 (a)

DISC DRIVE MULTIPLEXER

TDM2 Dual Unit: 2 computers/one drive unit	£75 (b)
TDM4 Quad Unit: 4 computers/one drive unit	£135 (b)

3M FLOPPY DISCS

5.25″ Discs in packs of 10	
744 40T SS DD	£10.00 (d)
745 40T DS DD	£12.00 (d)
746 80T SS DD	£14.50 (d)
747 80T DS DD	£15.50 (d)

(Add £1 for library case packing)

3.5″ Discs in packs of 10	
80T SS DD	£20 (d)
80T DS DD	£25 (d)

BULK DISCS

High quality unlabelled discs supplied in packs of 50 in a storage box. The 5.25″ discs have the reinforcing hub rings. These discs are guaranteed for life.

50 5.25″ 40 T single sided discs in lockable box.	£35 (b)
50 5.25″ 80T double sided discs in lockable box.	£45 (b)
50 3.5″ 80T double sided discs in lockable box.	£95 (b)
FLOPPICLENE DRIVE HEAD CLEANING KIT	
5.25″ Kit with 20 disposable discs	£12.50 (d)
3.5″ Kit with 20 disposable discs	£14.00 (d)
DISC STORAGE BOXES	
DB340 Lockable 40 x 3.5″	£8.50 (c)
DB550 Lockable 50 x 5.25″	£9.00 (c)
DB570 Lockable 70 x 5.25″	£11.00 (c)
DB5100 Lockable 100 x 5.25″	£13.00 (c)

MONITORS

BBC lead incl with all monitors

MICROVITEC 14″ RGB Monitors Please specify plastic or metal case.	
Microvitec 1431 Standard Resolution 453 pixels	£179 (a)
Microvitec 1431AP As 1431 + composite video and sound input	£199 (a)
Microvitec 1451 Medium Resolution 653 pixels	£225 (a)
Microvitec 1451AP As 1451 + composite video and sound input	£259 (a)
Microvitec 1441 High Resolution 895 pixels	£365 (a)
Microvitec 20″ RGB/PAL/ Audio Monitors	
Microvitec 2030CS Standard Resolution RGB/Comp Video	£380 (a)
Microvitec 2040CS High Resolution RGB/Comp Video	£685 (a)
TOUCHTEC-501 Brings genuine touch screen operation on metal cased Microvitec monitors, incl utilities disc with starter and development programs	£239 (b)
TAXAN SUPER VISION 620 (NEW) 12″ Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible	£279 (a)
TAXAN SUPER VISION 625 (NEW) 12″ Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible.	£329 (a)
MITSUBISHI XC1404 14″ Med Res RGB Monitor Etched dark screen brilliance and contrast control, BBC/IBM compatible	£219 (a)
12″ MONOCHROME MONITORS	
TAXAN KX 117 Hi Res green etched screen	£85 (a)
TAXAN KX 118 Hi Res Long Persistence (P39)	£95 (a)
TAXAN KX 119 Hi Res amber etched screen	£95 (a)
PHILIPS BM 7502 Hi Res green screen. Supplied with swivel stand	£75 (a)
PHILIPS BM7522 Hi Res amber screen. Supplied with swivel stand	£75 (a)
MONITOR ACCESSORIES	
Microvitec Swivel Base (14″ plastic monitors)	£20 (c)
Philips Swivel Base	£14 (c)
Monitor Stand Models B & B+	£10 (c)
Monitor Stand Master	£13 (c)
Double Tier stand Models B, B+ or Master	£24 (b)
Taxan RGB Lead	£5 (d)
Microvitec Lead	£3.50 (d)
Monochrome BNC/Phono Lead	£3.50 (d)

EPROMS/RAMS

2764-25	£3.20 (d)
27128-25	£3.50 (d)
6264LP-15	£2.80 (d)
27256	£5.50 (d)
27512	£9.00 (d)

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms + 2 8K Rams	£37 (c)
ATPL Battery backup kit	£16 (d)
ATPL Board for BBC+ (now in stock).	£31 (c)

TIME WARP

Real Time Clock. Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program	£31 (d)
Time Warp with PANOS Utilities.	£39 (d)

MODEMS

All modems listed below will be supplied with BBC Publications ModemMaster comms package and a BBC data lead.

MIRACLE WS2000V21/23 & BELL stds	£92 (c)
WS2000 Auto Dial Card	£27 (d)
WS2000 Auto Answer Card	£27 (d)
WS2000 SK1 Kit	£5 (d)
WS2000 User Port Lead	£5 (d)
MIRACLE WS4000 V21/23	£135 (b)
MIRACLE WS3000 V21/23	£265 (b)
MIRACLE WS3000 V22	£445 (b)
MIRACLE WS3000 V22 bis	£585 (b)

(All modems are BABT approved)

BBC Data Cable for WS3000/4000	£7 (d)

PROGRAMMING ACCESSORIES/SOFTWARE

See page 5 for detailed specification

Compatible with B, B+ and Master

EpromRyter (Epromer II) Eprom Ryter is compatible with BBC Master only	£119 (b)
Upgrade of Epromer II to Eprom Ryter	£49 (b)
EPROMER II	£89 (b)
MPROMER	£49 (c)
META ASSEMBLER	£145 (b)
PORTAL EPROM EMULATOR 128/512K	£245(b)
TEAM Disassembler	£145 (b)
EPROM ERASERS	
UV1B 6 eproms, safety cutout	£47 (b)
UV1T 6 eproms, timer, safety cutout	£59 (b)

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE
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305 Edgware Road, London W2 Tel: 01-723 0233

CAD/DRAWING PACKAGES

NovaCad Cad Package for B, B+ & MASTER. (See page 5 for specification)

Tracker Ball/Mouse Version (TM)	£79 (d)
TM Version plus Tracker Ball	£119 (c)
TM Version plus Mouse	£105 (c)
Plotter Driver Generator	£25 (d)

MOUSE

AMX MOUSE with SUPER ART (psc specify B, B+ or Master)	£63 (d)
PAGEMAKER	£39 (d)
EXTRA/EXTRA (utility for the Pagemaker)	£21 (d)
MAX	£17.35 (d)
STAND ALONE MOUSE (includes horizontal scroll lock)	£34 (c)

RB2 TRACKER BALL

RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' for use with NOVACAD & other software)	£47 (c)
Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR incl VAT	£39.50 (d)

CP/M SOFTWARE

for Acorn, Torch & Multiform Z80 Processors

MICROPRO's Wordstar Professional	£310 (a)
ASHTON TATE's DBASE II	£310 (a)
SUPERCALC II	£195 (a)

Send for details on our full range of CP/M & PC DOS packages for Business, Communications & High Level Languages.

*All software supplied by us is known to operate with the appropriate Acorn Disc filing systems. We **cannot** comment on their use with other DFS systems.*

BBC SOFT/FIRMWARE

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£41 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)

WORD PROCESSORS

VIEW 2.1	£37 (d)
VIEW 3.0	£56 (c)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£7 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£49 (d)
INTERWORD (If you own a WW+ then quote your reg number and pay £39).	£46 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£41 (d)
WINDOWMATIC	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£39 (d)
INTERCHART	£27 (d)
ULTRACALC	£52 (d)
MINI OFFICE II DISC Version	
For B & B+ 40T or 80T	£14.75 (d)
For Master 80T	£17.30 (d)
For Compact	£19 (d)
MINI OFFICE II ROM Version	
For Master, Compact, B+ & B	£48 (c)

LANGUAGES

META ASSEMBLER	£145 (b)
TEAM DISASSEMBLER	
MACROM	£33 (d)
ACORN MICRO PROLOG	£62 (d)
ISO-PASCAL	£51 (c)
ISO-PASCAL STAND ALONE GENERATOR	£30 (d)
OXFORD PASCAL (40 or 80T) Specify B or B+	£36 (d)
OXFORD PASCAL for Master	£52 (d)
ACORN LOGO	£46 (c)
LOGOTRON LOGO	£55 (c)
BBC PUBLICATIONS OPEN LOGO	£59 (c)
ACORN LISP ROM	£43 (d)
ACORN FORTH ROM	£39 (d)
ACORN COMAL ROM	£43 (d)
MICROTEXT	£52 (c)
MICROTEXT PLUS	£229 (b)

COMMUNICATIONS

TERMULATOR	£25 (d)
COMMSTAR II	£28 (d)
COMMUNICATOR	£49 (d)
MODEM MASTER	£11 (d)
COMMAND (Specify modem type)	£34 (d)
MASTER TERMULATOR	£34.75 (d)

COMPACT
(all on $3\frac{1}{2}''$ disc)

ARTROOM	£27 (d)
FONTWISE+	£22 (d)
FONT EDITOR	£22 (d)
RAMROD	£37 (d)
BROM PLUS	£32 (d)
MACROM	£37 (d)
BETABASE	£27 (d)
WHITE KNIGHT MKII	£16 (d)
BBC PUBLICATIONS BUNDLED SOFTWARE	£18.50 (d)

UTILITIES

ACCELERATOR	£49 (d)
ACORN BASIC EDITOR	£24 (d)
MONITOR (BBC Pub)	£34 (a)
BROM PLUS	£26.50 (d)
SLEUTH	£23 (d)
TOOLKIT PLUS	£31 (d)
TOOLBOX 2 (BBC Pub) Manual	£9.50 (d)
Cassette	£9 (d)
ACORN GXR GRAPHICS ROM specify B or B+	£24(d)
PRINTMASTER	£24 (d)
PRINTWISE	£24 (d)
DUMPMASTER	£26 (d)
FONTWISE PLUS	£17 (d)
HERSHEY FONT CHARACTER GENERATOR	£18 (d)
ICON MASTER	£29 (d)
MOVIE MAKER Two Roms + Cassette	£26 (d)
ADV TELETEXT UTILITIES ROM	£7.95 (d)

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

PRIMARY EDUCATION

ASTRONOMY	£11 (d)
COMPUTERS AT WORK Aud/EC/disc	£16 (c)
PICTURE CRAFT Disc	£17 (d)
INTRODUCING GEOGRAPHY Disc	£16 (d)
MATHS WITH A STORY 1 Cass	£8 (d)
MATHS WITH A STORY 2 Cass	£8 (d)
NUMBER GAMES Cass/EC	£7.50 (d)
USING YOUR COMPUTER Cass	£24 (c)

SECONDARY LEARNING

TECHNOLOGY & DESIGN Pt1	£21.50 (c)
ELECTRIC FIELDS	£10.50 (d)
ADVANCED LEVEL STUDIES: STATISITICS Disc	£23 (d)
ADVANCED STUDIES: GEOGRAPHY Cass	£10 (d)
INSIDE INFORMATION Prog Cass	£10 (d)
Audio Cass	£5 (d)
Book	£8 (d)
SCIENCE TOPICS (ST)	
S.T.:WAVES Disc	£14 (d)
S.T.:RELATIONSHIPS Disc	£14 (d)
S.T.:BONDING Disc	£14 (d)
S.T.:ELECTROMAGNETIC SPECTRUM Disc	£14 (d)
S.T.:ELECTRONICS IN ACTION Disc	£14 (d)
S.T.:NEWTON & THE SHUTTLE Disc	£19 (d)
S.T.:ECOLOGY Disc/EC	£19 (d)
S.T.:POLYMERS Disc/EC	£19 (d)
S.T.:CLASSIFICATION & PERIODIC TABLE Disc	£20 (d)
S.T.:FOOD & POPULATION Disc	£20 (d)
SEC.SCIENCE MICROTECHNOLOGY Cass	£7 (d)
SEC.SCIENCE:THE MOLE CONCEPT Disc/Aud/EC	£16 (c)

GENERAL

VU-TYPE PROFESSIONAL Disc	£19 (d)
WHITE KNIGHT MK II (for compact) Disc	£16 (d)
BATTLEFIELDS Cass	£8.50 (d)
A VOUS LA FRANCE Cass/EC	£17 (d)
Book	£5.25 (d)
Audio Cassettes (2)	£7.50 (a)
Additional charges for discs	£9.00 (d)
DEUTSCH DIREKT Disc/aud/EC	£16 (c)
Book	£5.95 (d)
MODEM MASTER	£11 (d)

Cassette based programs listed above can be supplied on disc at an extra charge of £1.50 per disc and please specify the format required 40 or 80T.

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(24 hr viewdata system)
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Orders welcome from government depts & educational establishments

All prices ex VAT.
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(b) £2.50
(c) £1.50
(d) £1.00

PRINTER ACCESSORIES

EPSON ACCESSORIES:

Interfaces:
8143 RS232....£30 (d)
8148 + RS232 + 8K....£65 (d)
8165 IEEE + Cable....£65 (d)
8132 Apple II....£60 (d)
8177P NLQ for FX80 + /FX100 + ...£99 (d)
Parallel & Serial Buffers of various size also available.
FX80/80 + /85 Tractor Attachment....£29 (c)
LX80/86 Tractor Feed....£21 (c)
LQ800 Tractor Feed....£47 (b)
LQ1000 Tractor Feed....£52 (b)
EX800/1000 Colour option....£59 (b)
H180 HP GL Emulation Rom + Ram....£63 (c)
H180 Printer Emulation Rom....£38 (c)

SHEET FEEDERS:
8338 LX80....£52 (b)
8333 FX100 + /105....£169 (a)
8331 FX80 + /85....£129 (b)
LQ800....£135 (b)
LQ1000....£179 (b)
EX800....£135 (b)
EX 1000....£309 (b)
FX 800....£135 (b)
FX 1000....£179 (b)

Ribbons:
RX/FX100/100 + . FX105....£7 (d)
RX/FX80/80 + , FX85....£4 (d)
LX80....£4.50 (d)
LQ800....£8.50 (d)
LQ1000....£10 (d)
EX800/1000....£7.50 (d)
H180 Pen Set (Aqueous/Ball point)....£8.25 (d)

Dust Covers:
FX80....£5.50 (d)
TAXAN/Canon KP810....£6 (d)
FX100....**£7.50 (d)** **KP910 £7 (d)**

HITACHI 672 Plotter
Aqueous Pen Set six pens....£18.50 (d)
Oil Based Pen Set six pens....£25.00 (d)

TAXAN CANON Accessories:
RS232 + 2K interface....£63 (d)
Ribbon, KP810/815/910/915....£6 (d)

Star Printer
NL10 Sheet Feeder....£52 (b)
NL10 RS232 Interface....£69 (c)
NL10 IBM Type Interface....£39 (c)
NL10 Ribbon....£4.50 (d)

National Panasonic KX P1080/81
Spare Ribbon....£4.50 (d)
Serial Interface....£39 (c)
KXP3131 Tractor....£90 (a)
KXP3131 Sheet Feeder....£189 (a)

JUKI 6100
RS232 Inerfaces....£65 (d)
Tractor Feed....£149 (a)
Ribbon (Carbon)....£2.00 (d)
Spare Daisy Wheel....£14 (d)
Sheet Feeder....£219 (a)

BROTHER HR20
Daisy Wheel....£18 (d)
Tractor Feed....£116 (a)
Spare Ribbon Nylon....£3.00 (d)
Spare Ribbon Carbon....£4.50 (d)

INTEGREX INK JET COLOUR PRINTER
Spare Ink Cartridge Black....£9 (d)
Spare Ink Cartridge Colour....£15 (d)
Paper Roll....£7 (d)

Printer Leads:
BBC Parallel Lead (1.2m)....£6 (d)
BBC Serial (Epson) Lead (1.2m)....£7 (d)
Other lengths can be supplied on order:
IBM Parallel Lead (2m)....£12 (d)

PAPER & LABELS
Plain Fanfold paper with micro perforations:
2000 sheets 9½"x11" 60 gsm/sq m....£12 (£3)
2000 sheets 14½"x11" 60gsm/sq m....£18.50 (£4.50)
1000 sheets A4 90 gsm....£12 (b)

Labels/1000:
Single Row 3½ × 1 7/16"....£5.25 (d)
Triple Row 27/16" × 17/16"....£5 (d)

WYSIWYG PLUS

WYSIWYG PLUS is a printer and screen utility for Wordwise Plus, View, Interword, and Basic users, supplied on a 16K Eprom. To obtain a particular printer effect, such as enlarged text, it used to be necessary to discover the appropriate 'printer control code' from your manual and incorporate it into your text. Secondly, you had to print several trial copies in order to position the effect correctly in relation to the rest of your text.

WYSIWYG PLUS simplifies this trial and error approach using easily remembered *commands. For example, *ENLARGED not only selects enlarged text on your printer, but uniquely shows you double width characters on your screen, even from within Wordwise Plus!

WYSIWYG PLUS incorporates a logo editor. Just draw your design on screen using the arrow keys, and save the results. Use the *GRAPHICS command to incorporate your design anywhere in your text; position and see your design in your text before faithfully reproducing a hard copy.

There is also special help for daisy wheel users. The *WHEEL command will prompt you to change daisy wheels whenever a change in type style is about to occur.

WYSIWYG PLUS is designed to work with the following systems:

BBC Model B
BBC Model B +
BBC Master 128
BBC Compact

6502 Second processor,
Turbo coprocessor
All printers (Except lasers)

WYSIWYG PLUS workspace is relocatable.

WINDOWMATIC

All users of Acorn's VIEWSHEET speadsheet program will be aware of its powerful windowing facility which allows the screen and/or printer to be configured in up to 10 seperate windows taken from anywhere in the sheet. They will also be painfully aware of how difficult and time consuming it is to set up a required display. Although VIEWSHEET allows configurations to be saved to the media, it does not have provision for deciphering them.

WINDOWMATIC has been produced with the intention of rectifying these shortcomings and to bring out the very best from VIEWSHEET.

WINDOWMATIC provides a quick and easy way to configure screen and printer allowing complicated documents and reports to be set up much more easily. It displays complete text information on all 20 windows and accurate graphic representation of the screen and printer output.

The package includes a screen dump routine for Epson printers and allows use of other printer dump packages.

WINDOWMATIC is compatible with BBC Master and BBC B+. A 6502 2nd processor must be fitted to a model B to run Windowmatic. Windowmatic is fully compatible with Turbo and 6502 2nd processor.

The program is supplied on disc with a comprehensive manual.

VU-TYPE

Do you have finger trouble when typing?
Do your letters look like this?

Dear Sor,
I wuold like to .....

then you need:
VU-type, a complete touch typing program produced by BBC/Pitman.
It allows you to learn at your own pace and has a wide range of exercises. Screen displays show the keys you have pressed and it will report on your speed and accuracy.
Supplied on a 40T Disc with a manual.
Available at a special price of £7.50(d)
instead of the usual £15. Offer valid while stocks last

EDUCATIONAL/FUN SOFTWARE BUNDLE

Wordmover
Wordplay
Pantry Antics
Drawstick
Locomotion

These programs are supplied from the BBC Publications Educational Software range and will be supplied on a 5.25" disc for BBC Master, B + and B and on a 3.5" disc for the Compact.

5.25" Disc £17.50(d)
3.5" Disc £18.50(d)
(Normal RRP over £40)

BOOKS

No VAT Carriage Code (c)

LANGUAGES
6502 Assy Lang Prog....£19.95
6502 Programming....£13.95
8086 Book....£23.95
Acorn BCPl User Guide....£15.00
Acorn FORTH....£7.50
Acorn LISP....£7.50
Acorn ISO Pascal Ref Manual....£10.00
Intro to COMAL....£10.00
Intro to LOGO....£7.50
Micro Prolog Ref Manual....£10.00
Introduction to Turbo Pascal....£14.95
Prog the Micro with Pascal....£8.50
The Supervisor's BBC Micro....£10.95

BBC MICRO GUIDE BOOKS
Inside Information....£8.95
Maths Prog in BBC Basic....£7.95
The Friendly Computer Book....£4.50
Toolbox 2....£10.95

PROGRAMMING/UTILITY
Advanced Sideways Ram User Guide....£9.95
Advanced User Guide (BBC)....£15.95
Applied Assembly Language on the BBC....£9.95
BBC Micro Advance Programming....£9.95
BBC Micro Ref Guide (B Smith).£10.95
BBC Micro Sideways ROM's RAM's....£9.95
Guide to the BBC ROM....£9.95
Beginners Guide to W.P....£7.95
Mastering Assembly Code....£8.95
Mastering Interpreters & Compilers....£14.95
Mastering View, Viewsheet & Viewstore....£12.95
View by B. Smith....£12.95
View 3.0 User Guide....£10.00
Viewstore User Guide....£10.00
Viewsheet User Guide....£10.00
Wordwise Plus....£9.95

SOUND & GRAPHICS
Computer Graphics & CAD Fundementals....£9.95
Mastering Music....£6.95

DISC DRIVE SYSTEMS
Advanced Disc User Guide....£16.95
Disc Book....£3.50
Disc Programming Techniques....£7.95
Disc Systems....£6.95
File Handling on the BBC....£6.95
Discovering Disc Drives....£POA
Practical Disc File Techniques....£5.95
Mastering the Disc Drive....£7.95
Mastering DOS plus....£12.95

APPLICATIONS
Interfacing Proj for BBC....£6.95
BBC and Small Business....£5.75
The Software Business....£5.50

TECHNOMATIC

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305 Edgware Road, London W2 Tel: 01-723 0233

NOVACAD

Computer Aided Draughting for the BBC Micro

"Novacad can drive a plotter to provide drawings of a high quality... Novacad is excellent. It is flexible, genuinely easy to operate without much practice, and a pleasure to use." **Beebug December 1986**

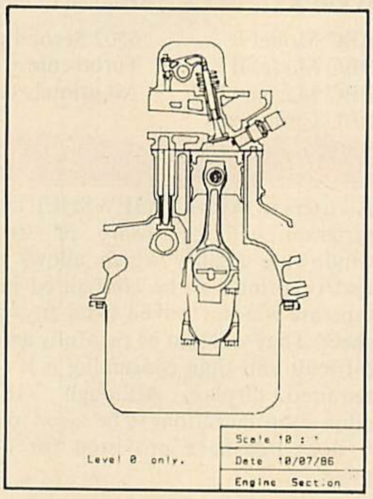
"Novacad is a professional package, well worth the £90 for the ROM and disc and is expandable to suit your own particular requirements. I would have no reservations if I heard Novacad called, "the best on the market"." **A&B Computing August 1986**

A sophisticated CAD package with unique facilities which are generally confined to the professional CAD packages costing thousands of pounds.

NOVACAD is being used in widely differing fields ranging from leading British industries for producing engineering drawings to Accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing professional quality output are making extensive use of NOVACAD's unique features. NOVACAD is proving to be a invaluable teaching aid in technical schools and colleges simply because of the ease with which it can be used.

NOVACAD'S MAJOR FEATURES

* Simple and easy to use with logical command sequence.
* A large drawing area (approx 15 screens).
* The ability to create complex icons (upto 500 lines instead of the usual 15 to 20 pixels), store them in a library and recall them at different scales and orientations.
* A zoom facility allowing magnification of up to 20 times to insert finer details.
* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique optional facility to output to any BBC compatible plotter.
* Cursor control from keyboard, tracker ball or mouse.



NOVACAD package includes a 16K ROM, Utility disc and a comprehensive manual.

MINIMUM HARDWARE REQUIREMENTS

- **Any BBC range computer with Acorn DFS.**
- **40 Track single sided single drive.**
- **Epson compatible dot matrix printer.**

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.

6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.
ROUTCAD, an optional software package for our Graphics Workstation allows for production of shapes drawn using NOVACAD in 3D on suitable material and is ideal for a range of applications including template making and model building.

EpromRyter

A powerful eprom programmer for use with the BBC Master. It offers the latest 'state of the art' programming techniques to provide fast and efficient operations.

The software is totally menu driven and on screen help messages make the programming simple for both specialists and novices alike.

The EPROMRYTER interfaces with the Master through 1 MHz bus. It is mains powered with its own psu. 3M Textool zif socket has been fitted to ensure consistent and reliable service over long periods.

The single rail eproms handled by the EpromRyter are:
- 2716 2732 2764 27128 27256 27512 27513 27011 2516 2532 2564 (NMOS & CMOS)
- One time eproms P27XXX, 87CXXX etc.
- Also A suffix eproms such as 27XXXA

EPROMER II

A proven Eprom programmer for BBC Model B and B+ with thousands in use in industry, educational and R&D establishments. It offers many of the powerful features of the EpromRyter and can program all single rail eproms upto 27256. Full details on request.

The main features of the programming software are:

* Device, function and voltage selection from the computer keyboard.
* Continuous display of the options selected.
* All eproms upto 27512 (64K) programmed in single pass.
* Automatic Intelligent identifier support for eproms able to respond.
* Selectable programming voltage 25/21/12.5V
* 3 programming methods: Normal, Intelligent & Pulse (20 sec for a 27128).
* Serial port protocols supported.
* Intel HEX, Motorola S, HEX and ASCII protocols supported.
* DFS, NFS, ADFS and Rom Filing System Supported.
* BASIC/Machine Code programming using RFS.
* Powerful editor with input in HEX or ASCII. * Full editable 64K file.
* Block move of data within the address range.
* User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
* Multiple loading for ROM Filing System

Some of the above features apply to Master Computers only

Watford Electronics

Acorn The choice of Experience

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774-40588 Tlx: 8956095 Fax: 01 950 8989

BY POPULAR DEMAND OUR SHOP IS NOW OPEN UNTIL 8PM EVERY THURSDAY

All prices exclusive of VAT; subject to change without notice & available on request.

Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

The choice after the Experience

BBC MASTER 128K Micro	£395
BBC MASTER with Turbo Board	**£493**
512K Processor Add on Board "inc. Mouse and GEM package"	£195

SPECIAL OFFER

FREE . . . £80 worth of Software

*Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control and **Acorn's** popular **MUSIC 500** Unit with every BBC Master 128K Micro bought from us.*

BBC MASTER COMPACT

Turbo 65C102 Add-on Module	£99
BBC MASTER ET (Econet Terminal)	£315
Econet Module for the Master	£43
ROM Cartridges for Master	£9
Universal Processor Adaptor	£75
Reference Manual I	(No VAT) £14
Reference Manual II	(No VAT) £14
Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£42
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
Z80 Acorn 2nd Processor package	£325
ARIES' Professional IEEE Interface	£265
Acorn IEEE Interface Complete	£280
Acorn Teletext Adaptor	£75
Acorn Bitstick I	£299
Robocom Bitstick II	£759
Upgrade for Bitstick I to II	£450
Bitstick Multiplotter Driver	£65

All Master Compact Microcomputers are supplied complete with an integral 3½" Disc Drive and various educational and professional bundled softwares.

System 1	**Standard Package**	**£385**
System 1A	System 1 + TV Modulator	£399
System 2	System 1 + Green Hires Monitor	£469
System 3	System 1 + Medium Res Colour Monitor	£599

RS232 Kit for BBC Compact	£26
Additional 3½" Drive for BBC Compact	£99

(Securicor carriage £7)

The 80186 Co-Processor Package

This package consists of the Master 512 board, Watford Co-Pro Adaptor, Acorn 1770 Disc Upgrade and Acorn ADFS. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

Only **£275.00**

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.

Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.

With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.

To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.

Master owners may use Co-Pro to add a second Co-processor externally.

Watford, brings power to your BBC at only:

£50.00 (carr £5)

VARIOUS PRINTERS

● FX80/85 Tractor Feed	£35
● EPSON Hi-80 Printer Plotter	£229
● Hi-80 Refils, set of 4 Pens	£6
● EPSON Paper Roll Holder	£17
● EPSON LX86 Printer	£181
● EPSON LX80/86 Tractor Feed	£20
● EPSON LX80/86 Sheet Feeder	£49
● EPSON LX800 Printer	£205
● EPSON FX1000 Printer	£439
● EPSON EX800 Printer	£405
● Colour option for EX800/1000	£55
● EPSON LQ800 Printer	£439
● Centronics GLP Printer	£95
● Centronics Printer Cable to interface all the above Printers to BBC	£6
● Brother M1009	£95
● GLP Paper Roll Holder	£9

(Securicor carriage charge on printers £7)

PRINTER SHARERS

(Ideal for School environment)

Connect 3 BBC Micros to 1 Printer	£60
Connect 6 BBC Micros to 1 Printer	£99
PRINTER CHANGER	
Connects 3 Printers to 1 Micro	£65

(Cables extra)

65C102 2nd PROCESSOR Package

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B.

Only £139.00

SPECIAL OFFER

EPROMs for BBC's Sideways ROMs.

2764-250nS £2.90
27128-250nS £3.25

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £2.70
2 × 6264LP (16K) £5.30

KAGA/TAXAN PRINTERS

(IBM/Epson compatibles)

Kaga KP815 Printer	**£269** (carr £7)
Kaga KP915 Printer	**£369** (carr £7)
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

RS232	£27	RS232 + 2K Buffer	£55
IEEE 488	£65	RS232 & 8K Buffer	£75

PRINTER LEADS

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£12

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£4.00
BBC Master	–	-
Brother HR15	£3.00	-
FX100	£7.00	-
FX80-MX80-FX85	£4.50	£4.95
RX80	£4.50	£4.50
LX80	£4.00	£4.50
Centronics GLP	£4.00	£3.75
KAGA KP810	£5.25	£4.75
Panasonic KX1080	£7.75	£4.75
Microvitec Metal Monitors	–	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

1,000 Sheets 9½" × 11" Fanfold Paper	£7
2,000 Sheets 9½" × 11" Fanfold Paper	£12
1,000 Sheets 15" × 11" Fanfold Paper	£9
1000 Sheets true A4 Fanfold Paper	£11
2000 Sheets true A4 Fanfold Paper	£21
Teleprinter Roll (Econo paper)	£4

Carriage on 1,000 Sheets £1.50

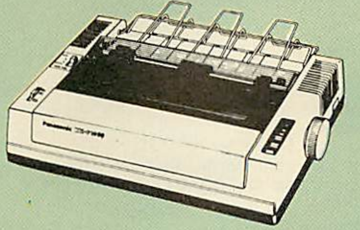
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	£5.00
1,000 90 × 36mm (Twin Row)	£4.90
1,000 90 × 49mm (Twin Row)	£7.50
1,000 102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

Panasonic KX-P1081
(Now IBM Compatible)



Available NOW at a superbly realistic price, the KX-P1081 perfectly balances features, quality of construction and Value for Money to produce the printer of tomorrow, here today, ready to sweep the current generation of machines away.

Ingenious innovation in terms of software control codes permits great flexibility when it comes to defining the print style. A nippy **120 cps** of clear Draft text backs up the crisp 24 cps Near Letter Quality text mode, with upto 40 superbly useful downloadable characters. A delightful range of assorted character widths is efficiently supported, with sizes ranging from a broad 5 cpi to petite 17 cpi, EVEN in NLQ mode. Some of the extensive support for serious use includes specialised functions to perform justification, centering and even left and right ranging. Proportional spacing permit even greater freedom when it comes to advanced use. Not only is the full Epson RX compatible control code set implemented, but extra codes have also been added to cater for the NLQ options, etc.

A full 96 ASCII character set is supported, with an extended set of 32 international characters and IBM special characters as well as IBM block graphics characters. A 1K Print Buffer alleviates much of the wait time normally associated with printing, whilst the bi-directional logic seeking print head takes the quickest route to print as required.

(Price inludes, FREE A 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£155** (carr. £7)

Optional RS232 Interface: **£39**

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional. logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A pronter of similar spec could cost a lot more than our ridiculously low price of:

Only **£245** (carr. £7)

Single Sheet Feeder	**£195**
Tractor Feed	**£90**
Spare Ribbon	**£3.75**

Acorn-Olivetti JP101 Ink Jet Printer

One of the main problems with most printers is that they are hopelessly noisy. How often have you wanted to print something late at night but not done so for fear of waking the children? Also ideal for those working in quiet environments such as libraries, etc. Silence the complaints with the serious solution from Watford at the amazing cost of only **£59**

JP101 accepts 9½" standard fan fold paper or single A4 sheets. Tractor & Friction feed supplied as standard – print speed 50 cps.

Pack of 4 refills **£10**

Screen Dump ROM for JP101 £10

256K PRINTER BUFFER Only: £149

(For full details on this extremely versatile, low cost – high performance Mega Printer Buffer please refer to page 3 of our advert.)

Printer Stand Type-YU-S25



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

£29



We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop. All Monitors are supplied complete with connecting lead.

MICROVITEC 14"

● 1431 – Medium resolution as used on the BBC television computer programme	£175
● 1451 – High resolution, suitable for word processing in mode 0	£225
● 1441 – High res, exceeds the capabilities of the BBC micro	£359
● 1431AP RGB + PAL and AUDIO	£199
● 1451AP RGB + PAL and AUDIO	£255
● Dust Cover for Microvitecs	£5.50

KAGA-TAXAN 12"

● KAGA KX1201G Hi-res Green Monitor	£85
● KAGA KX1202G Long persistence Hi-Res Green Monitor	£93
● KAGA KX1203A Ultra-Hi-Res Amber Monitor	£93
● KAGA Super Vision 2 Hi-res RGB Colour monitor. Ideal for Wordprocessing	£269
● **Kaga Super Vision 3,** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue	£319
● 12" Anti-Glare Screens	£9.50

STAR BUY

● PHILIPS 14" Hi-Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono connectors. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display.

ONLY £209

ZENITH

"Test Bureau Recommended for use in Education"

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith PC Systems.)

Green (New Design) Hi-res	£69
Amber (New Design) Hi-res	£74

LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for KAGA	£3

N.B. carriage on Monitors **£7** (securicor)

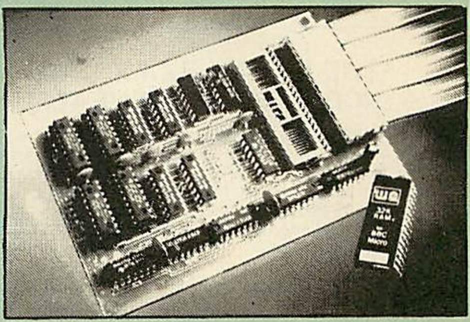
SWIVEL BASES

for Video Monitors

By placing your monitor on one of our superb swivel bases, you gain the freedom to adjust the monitor viewing angle to suit your needs. By doing this, you alleviate eye strain and reduce back stress.

for 12" Monitors **£10** (carr. £2.50)
for 14" Monitors **£14** (carr. £2.50)

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

● IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

● "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

● In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

● Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

● Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

● Ensure COMPATIBILITY with a vast range of hardware (including our ROM board, the ATPL ROM boards, double density boards, second processors), and software (including BASIC, TOOLKIT, VIEW, WORDWISE (1.20+), WORDWISE-PLUS, Music 500's AMPLE). This is because our board, unlike those of our competitors, is connected to the computer by a ribbon cable and has the power consumption of a couple of ROMs!

● Achieve EASY OPERATION with ROM based software. A large range of commands is available for machine code and BASIC users, including some useful *HELP messages, and a comprehensive manual is supplied free.

● Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

See next page for SPECIAL OFFER

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

Continued →

INCREDIBLE WORD PROCESSING DEAL ! ! !

Watford Electronics, already renowned for quality products at discount prices, are offering, the truly spectacular BARGAIN OF THE YEAR!
A Watford's 32K Shadow RAM Card – Printer Buffer and the much sought after, Computer Concepts' Inter-WORD, (a very powerful package) All this at an astounding price of:

Only £89 (carr £3)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED (BOOK)

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.
However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.
Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.
This book describes in plain, easy to understand English, how to use and make the most of your KP810, Canon PW1080A or any Epson FX80 compatible Printer with the BBC Micro, both from Basic and Wordwise.
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

Superb Value at **£5.95** (No VAT)

NOW WITH EXTRA FEATURES AT NO EXTRA COST Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities ten simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for four years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS).***

PRICES

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£62**
- *Acorn's 0.90 DFS Kit complete* **£57**
- *DFS Manual (Comprehensive)* (no VAT) **£6.95** *(P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs).*
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics and their appointed dealers only. Every ROM carries a special label with LOGO and serial number.*

WATFORD's DOUBLE DENSITY DFS INTERFACE

The DDFS from Watford Electronics represents a new standard in DFSs for the BBC micro. This is a double density version of our popular single density DFS, and combines all the features of this powerful DFS with the advantages of a system that gives 80% more storage per disc in double density mode. P.S. – Please note that not all DDFSs are capable of providing either the full 80% storage increase, or of allowing a file the full size of the disc – Ours allows both of these! Operates both in Single & Double Density modes.

The typical piece of games software these days is provided upon a protected disc. In order to work on any double density system (including the others on the market) a protected piece of software needs to make calls through the OSWORD &7F routines. To ensure compatibility, the Watford DDFS features probably the most comprehensive and powerful 8271 emulation ever written for a double density system.

PRICES

- *Complete DDFS Kit incl. fitting instructions* **£46**
- *DDFS Manual* (no VAT) **£6.95**
- *We will exchange your existing Single Density DFS Kit for our DDFS Unit at* **£29**

NEW MEGABUFFER 256

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £2)

MYSTERIES OF DISC DRIVES & DFS REVEALED (BOOK)

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.
Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

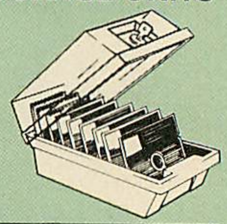
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£8

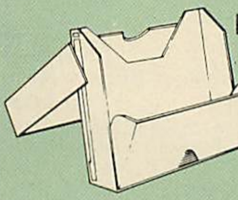
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection –
Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

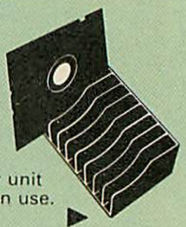


- M35 - holds upto 50 5¼" discs **£8**
- M85 – holds upto 95 discs **£9**
- M50 – holds 50 3½" Discs **£10**

PLASTIC LIBRARY CASES



◀ Holds up to 10 5¼" Discs. **Only £2.00**



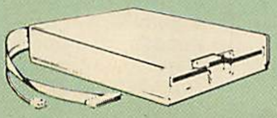
DX-08: This extremely handy unit holds upto 8 5¼" Disc while in use. **Only £2.00** ▶

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

SPECIAL DISC DRIVE/DDFS OFFER

Type CLS400



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular DDFS Disc Interface (allows 720k storage). Will run in both Single and Double Density modes *40/80* track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks last)

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our drives are of Japanese manufacture. All our 80 track drives are already fitted with a 40-80 select switch.

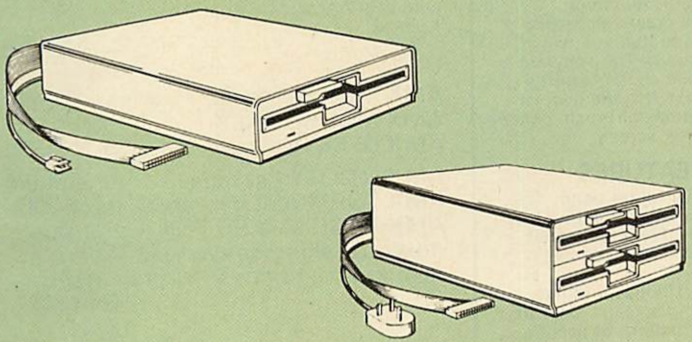
All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below for single drives is for a single drive in a standard single case. Single drive in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 10th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £95		CS 200 £108	
400K (720K)	CLS400S £96	CLD 400 £180	CS 400S £109	CD400 £200
800K (1.44M)		CLD 800S £183		CD 800S £204

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
L = Less PSU
S = Single
D = Double

*Suffix **S** = 40-80 Switchable*

e.g. *CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40-80 track).*

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes* ***£10***
- *10 × 5¼" D/S D/D 40 Track Diskettes* ***£12***
- *10 × 5¼" S/S D/D 80 Track Diskettes* ***£15***
- *10 × 5¼" D/S D/D 80 Track Diskettes* ***£15***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT* ***£30***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£18***
- *10 × 3½" D/D D/D 40/80 track Discs* ***£22***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 × **M3** 3½" D/S D/D 80 Track Discs* ***£20***
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* ***£9***
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* ***£11***
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* ***£14***
- *3" Double Sided Discs* ***£3 each***

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£46	£49	£72
● With Sleeves	£49	£52	£75

ACORN WINCHESTER DRIVES

Suitable for direct connection, via the 1MHz bus, to any BBC running ADFS. These Acorn Winchester disc drives are fast and extremely reliable. Each Winchester comes complete with the Level III Econet File Server software.

10 Megabytes **£1050; 30 Megabytes £1549**

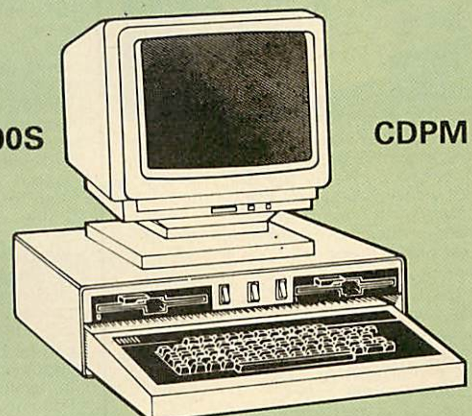
WATFORD's WINCHESTER DRIVES

- 20 Megabytes with ADFS **£635**
- 40 Megabytes with ADFS **£999**

WINCHESTER WORKSTATION

20 Megabyte Winchester, plus a Tape Streamer and a 400K Floppy Drive all housed in a plinth with cooling fan **£1499**

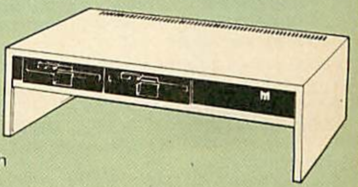
CDP 800S **CDPM 800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

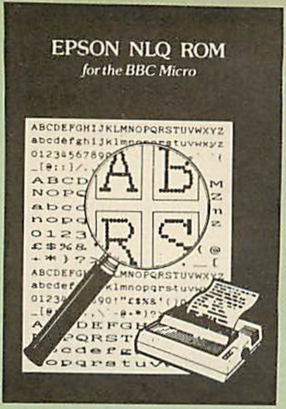
CDP 800S for BBC Micro £210 **CDPM 800S for Master £225**
(Securicor Carr. £7)

ACORN'S Twin 800K Disc Drives



Specially mounted side by side in a Master Plinth. Supplied complete with Cables. Plugs directly to the Master Computer.

RRP £250 **Our Price: Only £199** (carr £7)



Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

THE NLQ DESIGNER

(The First & still the Best)

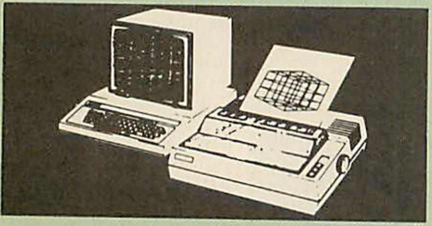
SPECIAL OFFER this Month: Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.

Supplied with disc containing over 25 example fonts. Please specify 40 or 80 track. Fonts are: Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print and Gothic etc. (P.S. This ROM is not suitable for Epson printers.)

- *NLQ Designer ROM & FONT Disc* ***£25***

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.

Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- *Vertical and horizontal scaling in all graphics modes and mode 7*
- *Rotation of image by 90, 180 or 270 degrees*
- *Left hand margin setting*
- *Screen dump window setting*
- *Colours appear as grey scale*
- *Two tone fast dump*
- *Colour mask*
- *Mode 7 contrast expansion*
- *Mode 7 contiguous dump*
- *Key triggered and User Port triggered dumps*

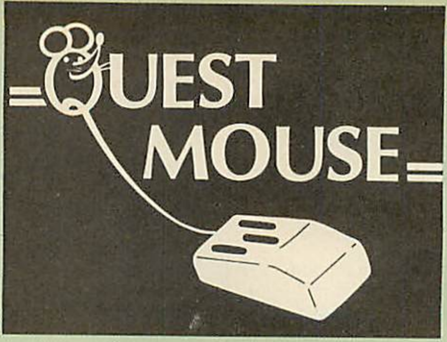
The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1080, Mannesman Tally and compatibles.

Only: £25

(Write in for further details on all above ROMS)



QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse. This package must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist looking for the most powerful drawing program around.

The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that programs such as AMX Pagemaker etc. will work with it. The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford Quest Paint software and also worn out mice can be replaced for minimum cost.

The Mouse features high resolution 50 PPI operation. It has a rubber ball for maximum grip on any surface and accuracy, thus eliminating the need for extra expense of a mat for the mouse, and has three buttons to allow a massive range of options to be accessed without touching the keyboard.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard. The software is carefully designed to provide all the features needed by the budding artist. It is the nearest we can get to using paintbrush, airbrush, pencil and rubber on your computer screen.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. For a full leaflet describing the software in full detail please write to us.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, dither pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or centre spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size change. Trace round areas of colour. Zoom for fine editing. Compatible with screens from Watford Beeb video digitiser. Load and Save screens with colour palette information, save brush and pattern definition etc.

QUEST MOUSE & QUEST PAINT	***£59***
QUEST MOUSE ONLY	***£35***
MOUSE MATS	***£5***
QUEST PAINT SOFTWARE	***£34***

(Quest Paint is supplied complete with Software in a 32K ROM, User Guide and Utility Disc)
(PS. The Watford Quest Mouse is FULLY Compatible with the AMX Mouse, therefore all AMX Software will work perfectly with it)

All prices in this advert are exclusive of VAT.

NEW

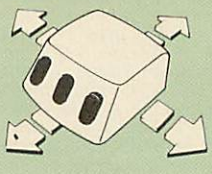
MARK II LIGHT PEN + PENPAL 2

The Watford Electronics Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Penpal II, Watford Electronics' sophisticated light pen software is also supplied free on cassette or disc (please specify). This is a highly sophisticated drawing package enabling you to gain the maximum benefit from your Light Pen. The software is used to edit Mode 2 full colour screens using lines, patterns and you own designs. Screens may be saved to cassette or disc.

Price Only £15

THE AMX MOUSE



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £63 (carr £1.50)
(Please specify for BBC or Master Computer)

We are giving away, absolutely **FREE**, our popular Colour Art software package worth **£15** with every AMX Mouse package purchased from us.

AMX MAT	**£5**
AMX MOUSE ONLY	**£35**
AMX DESK Package	**£19.00**
AMX UTILITY Package	**£11.00**
AMX SUPERART Package	**£39**

AMX PAGE-MAKER Pack – A desk-top publishing software. It Works with keyboard, joystick and a mouse **Only: £32**

We are giving away, absolutely FREE, PAGE-FONTS, a disc containing over 20 fonts, with every purchase of AMX PAGE-MAKER from us.

PAGE-FONTS Over 20 fonts for use with AMX PAGE-MAKER	**£9.50**
EXTRA EXTRA	**£19**
AMX 3D ZICON Disc	**£19**
AMX Database Disc	**£19**
AMX XAM Educational	**£19**
AMX MAX(A gem of desktop (ROM)	**£17**

RB2 MARCONI TRACKER BALL

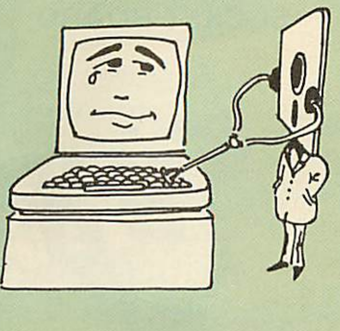
This popular unit is supplied complete with software.
Price: **£59**

FLEET STREET EDITOR

Software pack **£35**

Admin Xtra Disc Utility	**£14.95**
Walt Disney Disc Utility	**£14.95**
Fonts N Graphics Disc Utility	**£14.95**

DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.
At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Cassette). 4 primary level maths programs **£10.95**
- Maths with a Story 2 (Cassette) 4 further maths programs **£10.95**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£19.95**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£14.95**
- BONDING: Science (Disc) O Level Chemistry program. **£14.95**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£14.95**
- ELECTRONICS IN ACTION (Disc) O Level program **£14.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£6.95**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£17**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£20**
- Modem Master (Disc) **£11.25**

TED

The Teletext Editor Package for serious users

TED is the brand new package from Watford Electronics for the editing and creation of teletext (Mode 7) screens and displays. TED is ideal for anyone wanting to create their own Mode 7 pictures (such as game title pages), designing animated displays for shop windows, exhibitions, classrooms, etc. TED is also probably the most powerful Prestel screen editor you will ever come across.
Supplied on a special 32k package, full facilities are providing for manipulating the screen, including easy to use pixel manipulation; line, column and block buffering and copying; left and right margins; large text in a variety of different fonts (contained within the ROM device); various borders and effects templates (contained within the ROM device); line and column insertion and deletion; easy to use graphics line drawing. Those are some of the features of editor itself. In addition to this, TED contains routines for taking a number of Teletext screens and creating them into an animated sequence, with user selectable display times, repeats on a group of shows, various entry methods (how the picture is put onto the screen), routing selection (both predefined and keyboard specific), chaining of other shows, etc. Scrolls treat the Teletext sequence as a very long page with a window onto it. Supplied complete with a comprehensive manual. There are many more facilities not mentioned here, so write in for a comprehensive leaflet; you'll wonder how you managed without TED.

Price: £35

ROM-SPELL

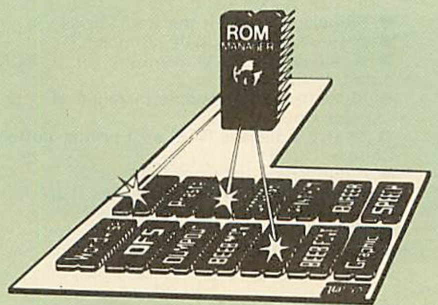
"way ahead of any competition"



Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.
NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

NEW

THE EUREKA CARD

(The Unique RAM Expansion System)

The Eureka Card is Watford's latest and most sophisticated RAM expansion system. Using advanced PAL based technology this card is a breakthrough in RAM systems for the BBC micro. The Eureka Card provides the user with around 58K of free memory in Basic, VIEW and WORDWISE PLUS. You also get Shadow RAM from within the active language. No other RAM expansion system can match that!
Load up to 58K long Basic programs. Texts in VIEW and WORDWISE PLUS up to 58K as well. This with absolutely NO loss of speed in accessing your text or program. Eureka consists of a card containing 64K of program memory, two parallel banks of sideways RAM and some extremely complex switching circuitry. This is all controlled by Eureka's highly sofisticated software supplied in ROM. Designed to a very high specification, this board is fully buffered to give reliable operation under virtually any circumstances.
The Eureka board plugs into the 6502 socket and has NO messy flying leads. It is compatible with many other products from Watford, such as our Solderless ROM Board and our ROM/RAM Board. All in all, the Eureka Card is an amazing board. Jump into the age of serious data processing with a Eureka Card! Please write in for further details 'on advantages the Eureka can offer you'.

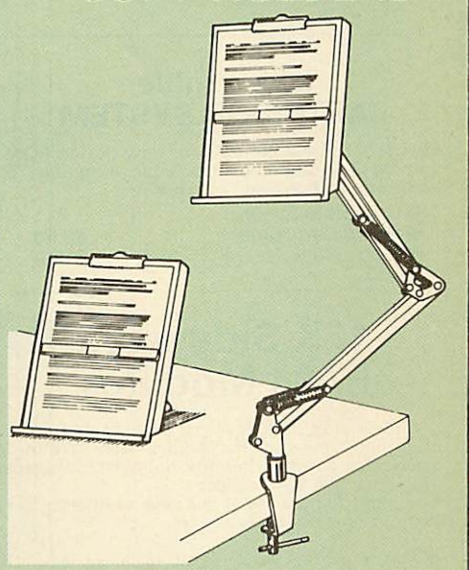
Introductory price: Only **£89** (carr £3)

(P.S. Eureka is only suitable for a standard model B; it normally replaces any Shadow RAM cards present. Some speed degredation does occur with filing system access. Eureka cannot be used at the same time as a second processor).

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24.**

COPY HOLDERS



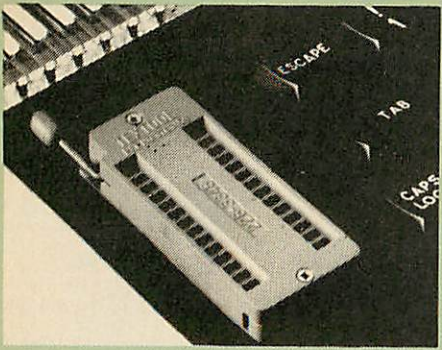
How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip.

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

All prices in this advert are exclusive of VAT.

Continued →

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

- Complete System **£11**
- Spare Cartridges **£2.50**
- Spare Rack **£1.50**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional extras

READ and WRITE protect Switches £2 each
Battery for Battery Backup £3

All prices in this advert are exclusive of VAT.

16K DISC RAM

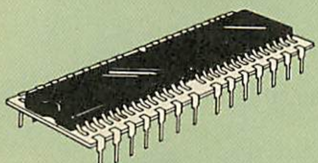
Unlike other RAM boards, this revolutionary, battery backed up, write protectable 16K sideways RAM board allows you to run from disc every sideways ROM available.
Features available are:

- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

New Low Price: £32 (carr £2)

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

SOLID STATE 16K SIDEWAYS RAM



This new unit from Watford, which utilises the latest in Static RAM technology, offers 16k of easy-fit sideways RAM in a very compact unit with a footprint no larger than a standard 28pin EPROM. With only a single flying lead terminating in a mini hook-on probe, to fit, (no soldering required) this compact unit works with any BBC Micro with or without a ROM board. ***Compatible with BBC B Plus.*** Like our other 16K RAM Modules, this unit is very simple to fit.

Only **£28** (carr 2)

Supplied complete with comprehensive software on Disc, Operating and fitting instructions.

Do you find the 16K Sideways RAM Units confusing? If so, we have compiled this quick questionnaire to help YOU decide which is the best one for you. If the answer to any of the questions is yes, then use the index number to select from the boards below. Options in brackets indicate possible secondary choices.

Do you require:

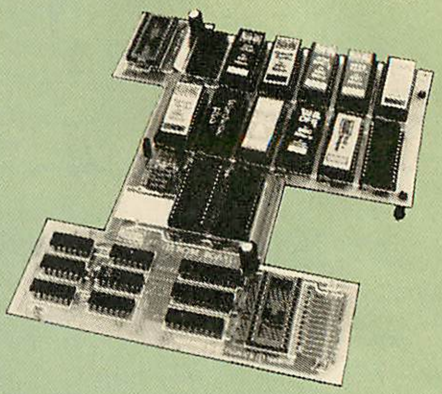
- Sideways RAM for a BBC B+ Choose 1, 2 or 3.
- Sideways RAM for the B+? Choose 3.
- A small, basic module? Choose 3.
- A sideways RAM module for a ROM board? Choose 1 or 3.
- More than one module installed at once? Choose 1 or 3.
- To use sideways RAM as a printer buffer? Choose 1 or 3.
- Battery Backup? Choose (1) or 2.
- Write protect for RAM (makes ROM look like RAM)? Choose (1) or 2.
- Read protect (allows recovery from crashes)? Choose 1.

Key:
1) 16k Sideways RAM Module
2) 16k Disc RAM
3) Solid State 16k Sideways RAM
4) Options in brackets indicate optional extras.

GRAPH PAD 2

Supplied complete with Software
£60 (Carr. £3)

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

NEW

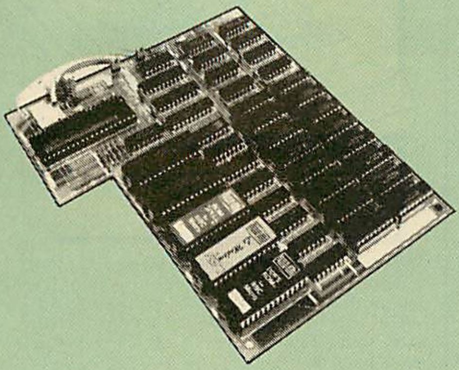
The BBC B+ Micro ROM EXPANSION BOARD

Specially designed for all BBC Plus users, this board sits in an external box, and will accept either 10 off 16k EPROMs, OR 10 off 32k EPROMs.
With the 32k EPROMs, only 5 can be 'online' at once (that's all the B+ can address, as each chip 'holds' two normal sockets worth), but you can swap between the two banks if necessary. With the 16k EPROMs, you can obviously address them all at once. An extra card can be added to permit 2 banks of 10 EPROMs to be used (again with only one bank available at once).
The ROM box, which has its own mains power supply, and connects to the BBC Plus via a specially designed card (which is a buffered card for your peace of mind) permits easy access to the EPROMs via the hinged lid. NO soldering is required for this board.

£79 (carr £2)

Watford ROM/RAM CARD

A must for all serious users



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM **£39***
- *ROM/RAM card with 64k dynamic RAM **£52***
- *ROM/RAM card with a massive 128k dynamic RAM **£80***

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit **£6***
- *16k Dynamic RAM for Upgrade **£7.50***
- *Battery backup **£3***
- *Read and Write protect switches ...... **£2 each***

*Complete ROM-RAM board (all options installed) **£89***

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***
- *BT Approval applied for.*

(When ordering, please specify the version required, (BBC or Master)

SPECIAL OFFER

Price: **£74**
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

£85

(Price includes: Nightingale Modem, Commstar ROM pack & Comprehensive manual)

Nightingale Modem without software	**Only £75**
COMMSTAR ROM package only (P&P on modem £3.00)	**£29**
Auto Dial Utilities Disc	**£9.50**

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£75** **(Carr £3)**
(Write in for full specification)

BT TELEPHONE CONNECTORS for Modems

LJU	1/4A Mini Line Master	£4.50
LJU	1/6A Mini Line Slave	£3.00
LJU	2/4A Line Master	£4.00
LJU	2/6A Line Slave	£2.50
LJU	3/4A Flush Master	£3.95
LJU	3/6A Flush Slave	£2.75
LJU	10/3A Dual Splitter	£5.50
	4 Way BT Plug	£0.75

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
DISC DOCTOR	£28
Graphics ROM	£23
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£24

Wordwise £24

Wordwise plus

WORDWISE PLUS £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £47

Inter SHEET ONLY £37

INTER CHART ONLY: £26

Inter-WORD

Only: **£39**

INTERBASE £59

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£37
VIEW 3.0 ROM	**£54**
VIEW PROFESSIONAL	**£85**
HI-VIEW (for use with 6502 2nd Processor)	**£36**
VIEW Printer Driver Generator Please specify Disc or Cassette)	**£9**
VIEWSHEET (Acornsoft)	**£37**
VIEWSTORE	**£37**
VIEWSPELL with 80 track disc	**£29**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£22**
VIEW-INDEX	**£12**
OVERVIEW Packs 1 & 2 for the Master	**£85**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£10
Juki & Brother HR15 (Disc)	£10
Silver Reed Printers (Disc)	£10

Micros in Business (Disc)

An introduction to Business software for the BBC Micro from Acorn **£43**

ADVANCE COMPUTER PRODUCTS' ROMs

Adv. Disc Toolkit	£29
Adv 1770 DFS for Mast/Compact	£29
Adv 1770 DFS for BBC/BBC+	£29
Adv Disc Investigator	£24
Adv. Control Panel	£29

MINI OFFICE II (disc) £14.50

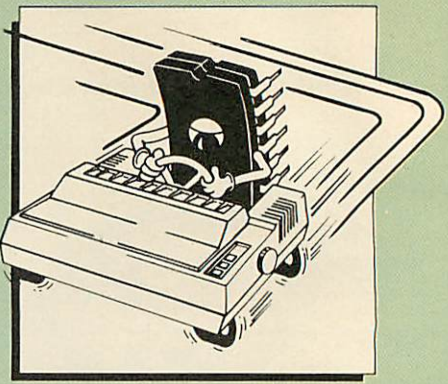
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering. Only **£20**

ROMAS

THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!

ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

6502, 65C02, Z80, 8085, 8041, 6809 and Z8
P.S. This includes the Acorn 6502 & Z80.

A give away at . . . **Only £29**

Please specify 40 or 80 track disc when ordering.

ARIES CORNER

Aries B-32 Shadow RAM Card

18 months of intensive research and development have produced a worthy successor to the widely acclaimed Aries-B20: the revolutionary Aries-B32. This 'second generation' expansion board features 32k of RAM and a 16k ROM socket.

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: B-32 **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries B-20 and the Aries B-32. For the business user or educationalist, the compact and secure internal fitting is ideal, with the ROM board tucked neatly inside the lid where it will not cause overheating problems. The serious software developer and the hobbyist may prefer to mount the board externally, giving instant access to the sockets for experimental purposes. A zero-insertion force (ZIF) socket may be fitted to the board to enhance this mode of operation.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable 'mother board' which carries the extension ROM sockets and a small 'base board' on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have an B32 or B20, a small adaptor module (the Aries B-12C) is available at a nominal cost. The 6264 static RAM chips used to provide the sideways RAM are advertised elsewhere in our advert.

Price:
Aries B-12 **£40.** Aries B-12C **£5**

THE ARIES RANGE HARDWARE REQUIREMENTS

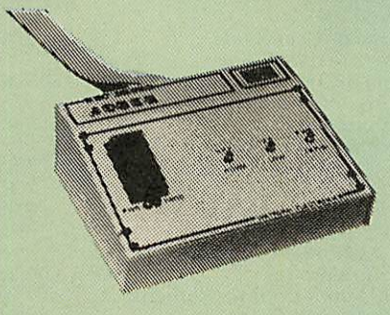
Aries B-32 & BBC B, MOS 1.20, hardware plugs into CPU socket.
Aries B-12 & BBC B, MOS 1.20, hardware plugs into all four sideways ROM sockets and connects to the B32 or the B20. The adaptor Aries B-12C module is necessary where these are not fitted.
Aries B-488 BBC B, MOS 1.20, Hardware plugs into 1MHz Bus.

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

Aries B-488 Unit: **£238** (Carr £3)

ADDER



Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£3 Carr)

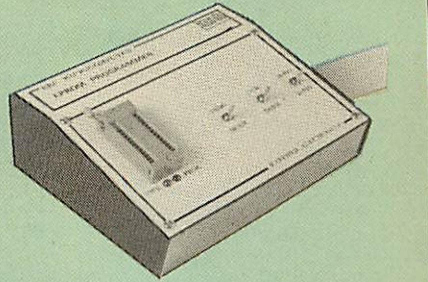
TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234-33383

EPROM PROGRAMMER



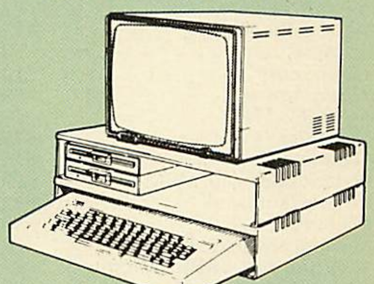
The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

SOFTWARE PACKAGE
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette-disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

SPECIAL OFFER £69 (£3 carr.)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£25** (carr £2.00)

Continued →

BOOKS (No VAT on Books)

15 Hrs Word Processor Using BBC	£3.95
30 Hour BASIC (BBC Micro)	£7.95
40 Best machine Code Routines	£7.95
50 Programs in BBC BASIC	£6.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Lang. Subroutines	£19.95
6502 Development System	£7.50
6502 Machine Code for Humans	£7.95
6502 Reference Guide	£9.95
68000 Assembly Lang. Programming	£19.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£16.95
Art of Music Graphics	£14.95
Advanced Disc User Guide	£16.95
Advanced BASIC ROM User Guide	£9.95
Advanced Programming Guide to BBC	£9.95
Advanced Sideways RAM User Guide	£10
Advanced User Guide for BBC	£13.95
Advanced FORTH	£9.95
Advanced Graphics with BBC	£9.95
Assembly Language Programming on BBC Micro	£11.50
Adventure into BBC BASIC	£6.95
Applied Assembly Lang. for BBC	£9.95
Assembler Routines for the 6502	£7.95
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Language Programming on the BBC & Electron	£8.95
Basic ROM User Guide	£11.95
BBC B Compendium	£5.95
BBC B+ User Guide	£14.95
BBC BASIC for Beginners	£7.95
BBC Hardware Projects	£8.95
BBC Micro & the small Business	£5.75
BBC Micro ROM Book	£10.95
BBC Master 128 High Flyer	£10.95
BBC Micro Advanced Ref. Guide	£10.95
BBC Micro Disc Companion	£8.95
BBC Micro File Handling on	£6.95
BBC User Guide	£10.00
BBC Software Projects	£6.95
BBC Wordprocessor Beginners Guide	£7.95
BBC Within the Micro	£13.95
BCPL User Guide	£14
C for Beginners	£10.95
C for Programmers	£9.95
Complete FORTH	£6.95
CP-M-86 User's Guide	£19.95
CP-M Bible	£16.50
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
CP-M The software BUS	£8.95
Creative graphics on BBC Micro	£7.50
Disc Drive Projects for Micros	£5.45
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
DBASE Programming Language	£14.95
Disc Programming Techniques	£9.95
Exploring FORTH	£6.95
Functional Forth for the BBC Micro	£5.95
Guide to BBC ROMs	£9.95
Graphics for Children	£6.95
Graphs & Charts on BBC Micro	£7.50
Hackers Handbook - New	£6.95
Inside Information (Computers, Communications & People)	£8.95
Interfacing & Robotics on BBC	£15.95
Introduction to COMAL	£9.50
Introduction to LOGO	£6.95
Introducing 'C'	£9.95
Introducing LOGO	£5.95
Introduction to FORTH	£8.95
Introduction to PASCAL	£17.95
ISO-PASCAL Reference Manual	£9.95
LISP 2nd Edition	£14.95
LISP, A Beginners Guide to	£10.95
LISP the Language of Artificial Intelligence	£9.95
Logo Programming	£9.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master Advance Reference Manual	£19.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Mastering View, Viewsheet & Viewstore	£12.95
Points of View	£6.95
Programming the 6502	£16.95
Programming the Z80	£19.95
Structured Basic	£7.95
Structured Prog. with BBC BASIC	£6.50
The Complete FORTH	£6.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
Turtle Graphics on BBC Micro	£7.50
Understanding FORTH – A Beginner's Guide	£6.50
Understanding Interword – A Beginners Guide	£6.50
View 3.0 User Guide	£10
View Guide	£4.50
Viewsheet User Guide	£10
Viewstore User Guide	£10
Within BBC Microcomputers	£13.95
Writing Interactive Interpreters & Compilers	£8.45
Wordprocessing BBC Beginners Guide	£7.95
Wordstar & CP/M made easy	£7.45
Wordwise + A User Guide	£9.95
Z80 Applications	£15.95
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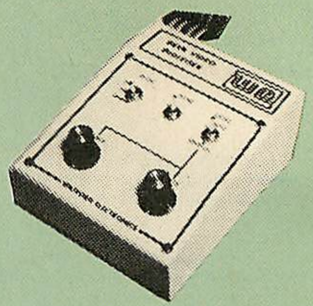
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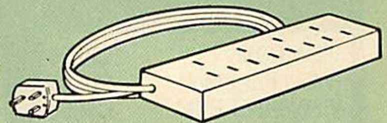
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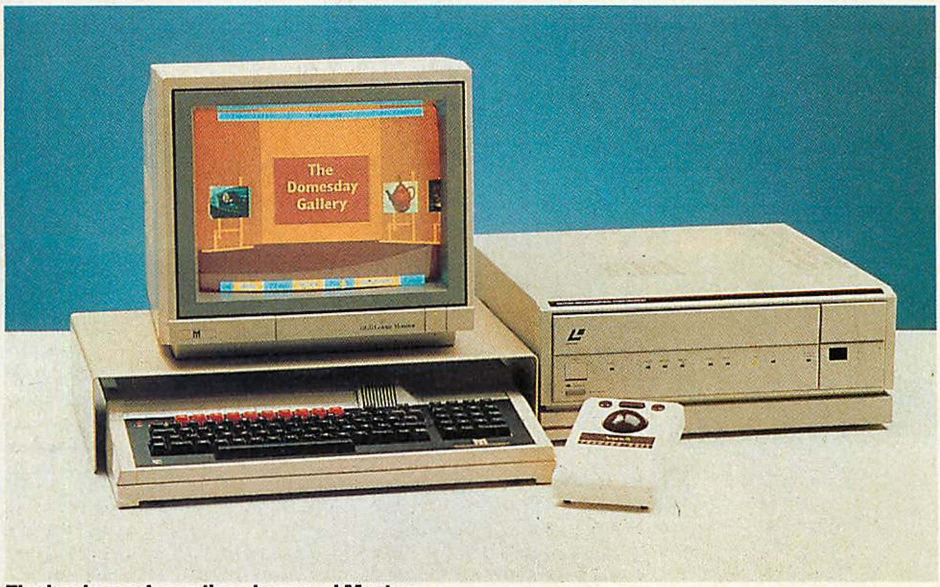
THE DOMESDAY DEVICE

Interactive video used to be slow and cumbersome, but laser technology has changed all that

Joe Telford

My previous experience of interactive video (IV) had come from building a VHS video tape interface in 1981, and writing software to make an early Beeb fast-forward to frames and fast-rewind to the start of passages. This was an inaccurate and feeble attempt, which only served to convince me that interactive video was at that stage both cumbersome and boring.

The chance to play with an early Acorn IV system in 1985 amused me further, as the only available disc seemed to be a BBC wildlife programme about birds. The operating system for the IV disc was quite tedious to integrate into any sensible language, though the few children to whom I showed the disc felt that the way ahead for them was Logo, interfaced to the service ROM in the machine.



The hardware: Laserdisc player and Master

Why interactive video?

One of the activities I really enjoy is messing with an applications based package, to see what makes it tick. You can imagine how I felt when news of the Domesday System filtered through and I, with many others, watched demonstrations, asked key questions and tried to imagine what I could do with it. Several months later, I can drive the beast from its applications based software, and from my usual languages. The question of what to do with it is still hard to answer, possibly because I think it's essentially a historical archive. Also, it has gaps, and although it won't go far enough into detail over some things, it goes into far too much depth over others.

We desperately need more experience of using interactive video, so I ask readers of this column to write in with their suggestions for and experiences of using Domesday in particular and IV in general. Try to group the uses under three headings: educational uses, industrial uses, and public uses. Let's see what we can come up with, but remember to test your application with some simple rules:

- Can it be done in another way more economically or more effectively?
- Will using it encourage interaction between people?
- Does it matter that the information is not first hand or up to date?
- What sort of thinking is the system supporting? Revision? Problem solving? Explorative?

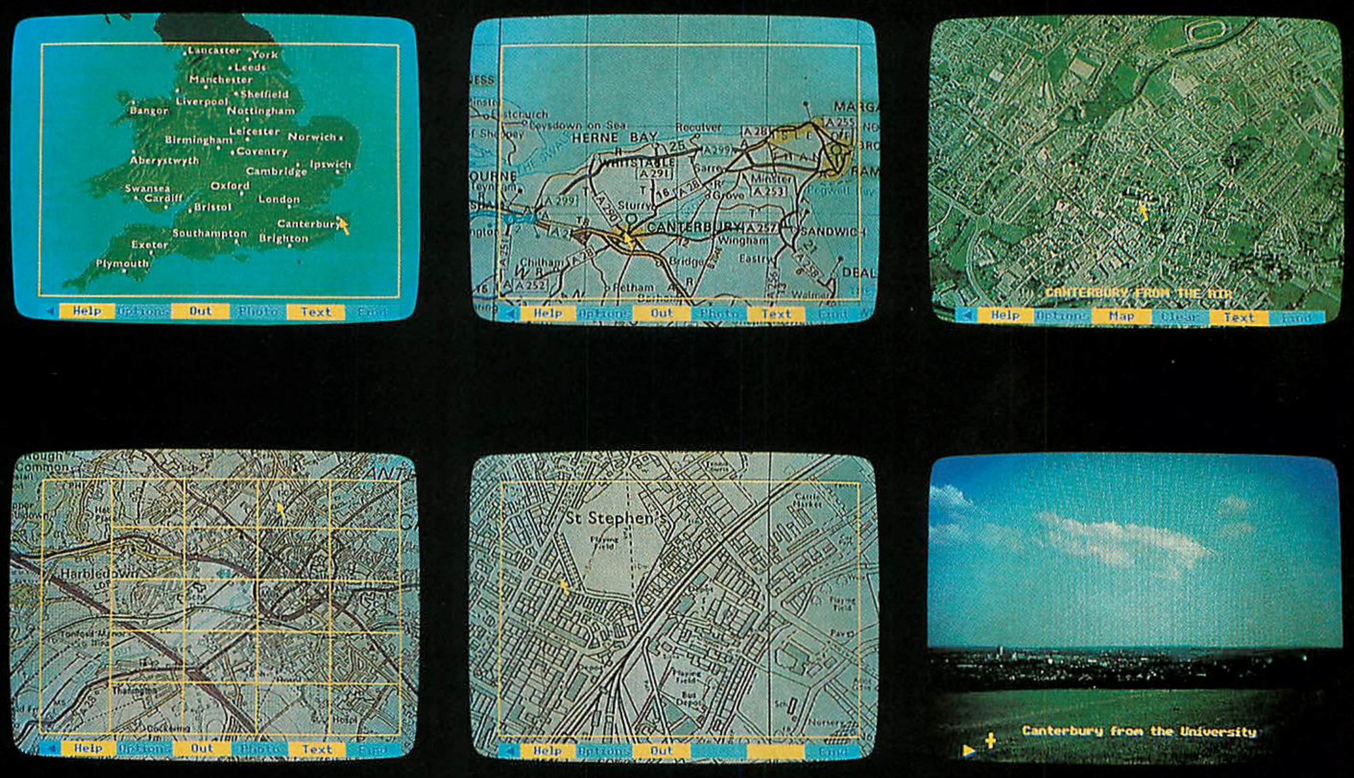
The system itself

The Master AIV system comes as a five part package which includes the Master 128 with 65C102 'Turbo' co-processor, an Acorn trackerball, a Philips RGB colour monitor, a Philips LV-ROM player, the Domesday discs and all connecting cables and manuals.

The Master 128 Turbo is a specially modified model, which has a wide 50-way ribbon cable attached to its rear. This is an SCSI (Small Computer Systems Interface) cable which connects to the LV-ROM player, and allows the Master to take control of the LV-ROM player's functions. But the Master can also be used as a normal micro, running all the packages just like a standard Master 128.

The trackerball, which looks rather like a Marconi trackerball with an added sticker, fits into the Master's User Port and sits easily on the right of the computer. It can also be lap-held so you can use the system from a distance.

The colour monitor is a medium resolution model which is very easy on the eyes. It has full screen control from easily accessible knobs and has a Euroconnector for 'proper' colour – you know, the sort you get on TVs with not just eight colours but the whole range of shades and hues. This is sometimes



The sequence above shows the power of the system. Using the mouse you can zoom in on any area (Canterbury in the example) in both maps and sattelite pictures. Many pages of descriptive text are also available written by local school children, and ground-level photographs of each area.

known as 'linear RGB' compared with the 'TTL RGB' of conventional models.

The LV-ROM player is easily the heaviest part of the package, because in addition to being a Laservision disc player, this beast is programmable via an infra-red remote handset, or via an RS232 link, and of course has its SCSI interface built in, which links directly to an onboard computer system. In addition the player has a Genlock card onboard, which locks the video signals from the BBC micro and the LV-ROM player together so that video mixing is possible, and a video mixer card.

The Domesday discs

While the rest of the package is hardware, capable of supporting a number of Laservision discs, the Domesday discs are a new breed called a LV-ROM disc. The ROM part of the title comes from the fact that all Laservision discs are read only, so the information on the disc cannot be altered.

There can be four things on any LV-ROM disc: moving pictures, a soundtrack (with two channels available), still frames (pictures) or data for text/graphs/program code, etc. The clever idea seems to be that data can exist on an LV-ROM disc in the channels allocated to sound. This means that while the number of picture frames can be of the order of 54,000 frames per side, the amount of computer-readable data can be immense, up to an incredible 350Mbytes per side (the equivalent of about 600 ADFS floppy discs). When you consider that most amateur users would have difficulty in ever filling a 30Mb Winchester hard disc with day to day usage, the size of the LV-ROM disc becomes astonishing. Have you noticed though, how technology is cyclic? Remember when you had to turn tapes over to read the other track? Well, that's just what you have to do with the LV-ROM discs.

The Domesday system comes with a total potential capacity of about 1400Mb, of which about half is filled. Future discs might be expected to be chock-full of data. The Domesday discs also come with a rather good user manual. It's a tribute to a good writing style and a very powerful and friendly system interface that most people can read pages nine, 10 and 11 of the manual then throw it away. Though, to be honest, the remaining 240 or so pages are worth reading, just to improve your confidence that you *are* pressing the right buttons.

The remainder of the pack is made up of leads, which are all sensibly fitted with plugs, and there should be no problem plugging everything together. The one point which has to be made is, look at the diagrams, the RGB lead connects the Master to the LV-ROM player, and the Euro-connector connects the LV-ROM player to the monitor. A further manual, the AIV User Guide, emphasises this, and gives a clear, if more technical, explanation of how the system works.

Starting up

Once the system is plugged together, it can be brought to life by switching on and pressing CTRL-Q-Break. This results in a message indicating that a video filing system

(VFS) is in operating, and this is the route in for the Fraternity of Hackers. More respectable application users will want to continue with Shift-Break and wait the few moments until the start-up message appears. To be honest, the start-up session seems the weakest part of the system. Several times the disc started and ran like a laserdisc player running a movie. It has to do this to begin with, but the computer should stop it. A further CTRL-Q-Break Shift-Break cured this in all but one case, where a total power down was needed.

One old (two months) system which I played with took three minutes to start up, and you can imagine the concern we felt, especially as there was no screen message for most of the start-up time. I eventually put this down to coldness, and it seems that the LV-ROM player must be switched on and allowed time to physically warm up.

The VFS ROM

Everything that happens in the system is controlled by the VFS ROM which, true to Acorn format, is compatible with most other filing systems. I noticed that there were even a few spare bytes for acknowledgements in the ROM, a sure sign that the writers have a degree of pride in their work. Inside the VFS are four major services: the VFS proper, the video control system, the mouse control system and the trackerball control system.

The VFS behaves much like a read only version of the ADFS. Although AIV systems can be organised with pathnames just like ADFS, the Domesday system has everything in one directory.

Some of the VFS commands are of little use and others appear spurious, because of the way in which users will work with the AIV system. Certainly I could not find much real use for *BACK, *DIR, *BYE, *DISMOUNT, *LCAT, *LIB, *MOUNT and *MAP. Although the VFS does not indicate their availability, users can apply the usual FS commands like: *DUMP, LOAD, *TYPE, *LOAD and the OPENIN/UP, BGET#, BPUT# and PTR# commands of Basic.

On the track of a mouse

The differences between the mouse and trackerball are apparently cosmetic, except that the internal hardware of a Marconi trackerball differs from that of an AMX mouse. The facilities available would bear use on any desktop, and it's a great pity that Acorn didn't squeeze them into every Master! Table 1 shows the main trackerball commands (remember that the mouse commands are identical).

The simplest commands can draw some very powerful graphics. Look at Listing 1 in the Yellow Pages, the mouse drawing program. This allows a mouse or trackerball to move and draw pictures. Notice that the pointer is turned off before drawing happens. This is so the lines aren't drawn over the mouse. Notice too that the pointer is switched back on in each loop.

Listing 1 may seem quite simple, but try calling up one of the video frames and then use the program to draw around the key shapes in the picture and save the result as an outline drawing. Now enter one of the graphics packs currently available and fill in the outlines with various colours and tones,

```
AUDIO <0-3> 0-off, 3-on
CHAPTER <digits> Plays chapter(s)
EJECT
FAST <dir.> Cue or Review
FCODE <string>
FRAME <no.>
PLAY <start>,<end> Plays from sta
   rt to end
(NB *PLAY <RETURN> plays from cur
   rent frame)
RESET
SEARCH <no.> As FRAME, but no wai
   t
SLOW <speed>,<dir.> Speed from 5
   (slow) to 253 (fast)
STEP <1/0/255> Stop/step player
STILL as FRAME
VOCOMPUTER computer to VDU
VODISC LV to VDU
VOHIGHLIGHT Computer colour highl
   ights LV
VOSUPERIMPOSE Computer over LV
VOTRANSPARENT LV & Computer mixed
VP <digit>
```

Figure 1. The available video commands

and then display the result. Pictures drawn like this can be quite enthralling and are well worth attempting.

The TMAX command needs a little more explanation. There are four separate pointer shapes, a cross, a magnifying glass, a north-west pointing arrow and a north-east pointing arrow. These exist in four quadrants. The cross over between quadrants can be set anywhere relative to the actual screen. The purpose of the TMAX (x,y) command is to set the point on the screen where the pointer shape changes, without having to continually monitor the position in the current high level language.

The video commands

Figure 1 explains the video commands available which allow control over the AIV player. With the Domesday disc the CHAPTER command seems redundant and in general terms the FCODE command is more useful to specialist applications and can be ignored in many simple programs. The set of VO- commands are versions of the VP command with different digits, for example *VP 2 is the same command as *VOCOMPUTER

Particularly interesting commands include: PLAY, which plays forwards or backwards; STEP, which moves forwards or backwards from one to 50 frames in an instant; and FRAME, which selects a nominated frame.

Interfacing video to Basic

Listings 2 and 3 include a set of Basic library routines (listing 3) and a demonstration program (listing 2) which explores the facilities of the AIV disc. The best way to explore the library routines is to read listing 2 and follow each PROC call to its DEF-PROC in listing 3 (apart from PROCm, PROCloop, and PROCdelay, which are all included in listing 2). Notice that PROCaudio and PROCstep require strings of 'ON' or 'OFF' and 'FWD' or 'BWD' respectively. Remember too that PROCstep must have a step parameter of 0 to 50. The procedures are explained in table 2.

I've not used the standard Acorn PROCoscli routine, so users of Basic 1 can't access these commands. All AIV owners will have Basic 4 at least, so the PROCoscli is replaced with OSCLI(" . . . ")

Taking control

One of the most valuable computing languages is Logo, and the most widespread version follow the LCSI 'standard', hence the dialect selected in this next section is the Logotron version of Logo.

One concern that people have raised about the Domesday system is that it is archival, and hence the techniques used are more akin to data handling than to programming. But still many teachers have suggested that there would be a lot of value in children exploring AIV discs, and designing 'set pieces' to answer a particular question, or to demonstrate a particular item which needs multiple frames. The whole idea of Logo as a presentation aid for AIV is quite exciting, because a suitable Logo microworld might include tools for exploring the disc, for storing frames by name, for replaying set pieces and for asking questions about still frames.

In addition, we might consider linking AIV to language, maths and problem solving activities with Logo using branching adventure stories, descriptive writing, eg, catalogues, and turtle graphics for drawing on frames, along with other useful learning

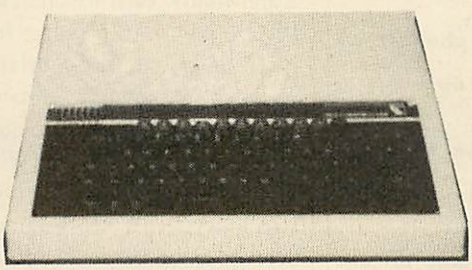
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1: THE MAIN TRACKERBALL COMMANDS

* TRACKERBALL (1)	Turns on the trackerball software
* TRACKERBALL 0	Turns it off
* TSET x,y	Sets pointer to location x,y with default at screen centre.
* TMAX x,y	Sets screen location for original of icons
* POINTER (1)	Displays moving pointer
* POINTER 0	Erases pointer
* POINTER 2	Erases and halts pointer
* POINTER 3	Displays and halts pointer
ADVAL 5 ADVAL 6	Returns value of TMAX x,y = 5,6
ADVAL 7 ADVAL 8	Returns current x,y position.
ADVAL 9	Returns state of the 3 buttons Button 1=Return 2=TAB 4=CHR$192

2: THE BASIC PROCEDURES AND THEIR FUNCTIONS

PROCplay (start, end)	Plays from 'start' to 'end'
PROCframe (no)	Shows Frame 'no'
PROCffwd	Fast-forwards the player until
PROChalt	Halts the player
PROCfbwd	Fast-rewinds the player until PROChalt
PROCaudio ("ON/OFF")	Selects sound/turns sound off
PROCsfwd	Slow-forwards the player till PROChalt
PROCsbwd	Slow-rewinds the player till PROChalt
PROCstep ("FWD/BWD", 0-50)	Steps disc shown in direction given
PROCboth	Selects computer and video pictures
PROChighl	Selects video highlighted by computer
PROCcomputer	Selects computer output only
PROCvdisc	Selects video output only

3: THE LOGO WORDS USED

Logo word	Function
SBWD	Slow rewind of player
SFWD	Slow forward of player
SLOW 1/255	Slow fwd/bwd (1/255)
BWD 1-50	Returns 256- (1 to 50)
FWD 1-50	Returns 1 to 50
HALT	Stops player
FFWD	Plays fast forward
FBWD	Plays fast backward
STEP "FWD/"BWD (1-50)	Steps in dir (1 to 50) frames
ON	Returns 3
OFF	Returns 0
AUDIO "ON/"OFF	Turns audio on/off
FRAME no	Displays frame 'no'
PLAY start end	Plays from 'start' frame to 'end' frame
FINISH	Blanks screen then ejects disc
VDISC	Video from player only
COMPUTER	Video from computer only
HL	Player video highlighted by computer
BOTH	Computer and player equal video

styles available in Logo. Listings 4 and 5 are a simple Logo Microworld which performs the 'set piece' of a trip to Telford Towers using the north side of the Community disc. The annotated journey is in a long procedure called JOURNEY1. Any words which you don't recognise as Logo primitives are defined elsewhere, either as part of the frame database, the general library or in the utility words of listing 5.

Observe particularly the use of the Logo commands:

UKSATPIC BLOCKNORTH

This shows how easily the frame can be overlaid with turtle graphics. If the major tools are provided, then the frames can be created simply by exploring the disc using its onboard software and noting the frame number of any interesting page. For example, the hamlet outside Telford Towers is on frame 13857 so we can store this frame in Logo with a simple procedure:

```
TO TOWERS
FRAME 13857
END
```

Even young children are able to build up set pieces in this way, and some can handle text and turtle graphics input to design multimedia displays.

The Logo words used in listing 5 are also shown in table 3. They cover the same procedures as the Basic procedures mentioned earlier, but are much more elegant! These utility words can be easily used to build up your own microworld set pieces like listing 4, or to explore the Domesday discs by entering commands such as FRAME 17337.

The future of AI video

With current costs as high as they are, there must be some concern over the future of AIV. The uptake of Domesday AIV discs has yet to enter the 100,000s and many companies are exploring other avenues of optical data storage, particularly the CD-ROM storage which has tumbled in price because of the mass uptake of CD players. However there are several projects on the way which support AIV players, and these projects should more clearly define the uses to which this newest of new technology can be put. Until then, here is a little problem for you to solve.

Using Logo and the Domesday national disc write a microworld tool which demonstrates a set of colour photographs concerning clothing. Begin your first frame store: TO KNICKERS . . .

Best of luck in exploring the fascinating world of the Domesday discs.



TELEPHONE LINES

So what exactly is a modem? Here are the answers to some common questions

Jeff Ashurst

For those of you all at sea with communications, or on the brink of diving in, this article should whet your appetite. From buying your first modem, to linking up to a bulletin board, we will answer the commonest questions about comms.

What are comms?
Short for 'computer communications'. Your micro can be connected to another computer via an ordinary telephone line, and the two machines can swap information. You can connect to a computer that provides the latest news, or one that sends you free software. Or you can leave messages on the other computer, for other people to read when they call.

What equipment do I need for comms?
Two fundamentals: a modem and some communications software.

The modem is the device which connects your computer to the telephone network. In general, it plugs directly into the phone system, but you need the new style of BT jack sockets to do this. British Telecom will fit them for a fee of £25.

Communications software is a program to handle the sending and receiving of characters and their display on your screen.

To connect to the modem, you need a lead to link it to the RS423 socket on the back of the BBC micro. With a Master Compact you also need a serial upgrade (see David Atherton's explanation in *Acorn User* January 1987).

Do I need a similar modem and/or software as a friend or colleague to be able to communicate directly?
The short answer is 'no'. Modems and comms software marketed for home and small business use in Europe are designed to comply with one or more of three internationally recognised standards known as V21, V22 and V23. These define the speed at which information is received and sent down the telephone line and also the line frequencies used. So provided that modems and software at both ends of a link are set to operate at the same standard, there should be no problems. Note, however, that V23 standard is a special case. It specifies different speeds for receive and transmit, and so for user-to-user communication one modem must be capable of operating in reverse, ie, transmitting at the higher speed.

Some software packages have the ability to save files on, or to copy from, a remote disc when used with similar software at the other end of a link. If this could be useful to you, then there would be an advantage in matching the software. This way, you could receive files from your colleague's machine more easily than if the software were different.

What exactly does a modem do?
Two things: it converts the string of electronic signals coming from the micro's serial port into frequencies which can be sent down a telephone line; and, conversely, it changes incoming frequencies back into signals recognisable to the computer. Both these processes are usually carried out simultaneously, allowing data to flow in both directions at once. This is known as 'duplex' operation, sometimes referred to as 'full duplex'.

Today's 'intelligent' modems have their own microprocessor and memory: they have auto-dial and auto-answer functions.

So what features should I look for when choosing a modem?
Choose one which will operate at both V21 and V23 standards. These are sometimes referred to as 300 baud and 1200/75 baud standards: these are the speeds of reception and transmission of data. This will give you the ability to access almost all dial up services available – bulletin boards, viewdata and electronic mail.

Another item to check is that the modem is 'approved' for connection to the phone system. All approved modems display a green circular sticker, non-approved ones have a red triangle.

I recommend the choice of one of the intelligent or Hayes-compatible modems (Hayes is an American modem manufacturer). The most sophisticated intelligent modems, incorporating the higher speed V22 operation, are still quite expensive, but others, like the Pace Linnet and Miracle WS4000, are more affordable.

How do Hayes commands help?
Hayes commands are really easy to use.

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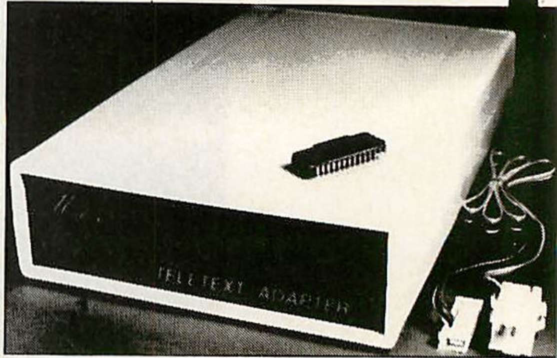
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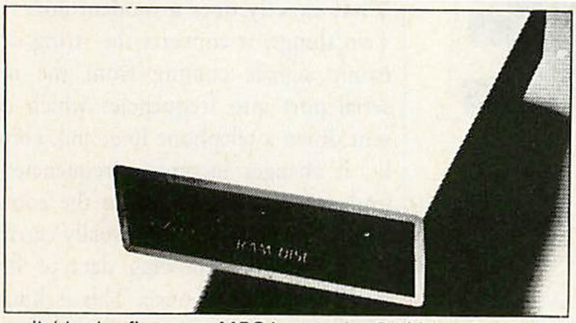
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Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase in speed, for example, a 20K mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc.

The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any Acom compatible DFS (not ADFS).

The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive no. is 4.

'Dangerous' * commands such as *COMPACT, *COPY, *BACKUP etc are intercepted and the BBC's RAM from page 2 to &7FFF is saved to RAMdisc workspace, and may be recovered using a * command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The save operation delays the * command by just under 0.4 seconds. The BBC's RAM can also be saved by an interrupt-driven routine which can be enabled by a * command.

The 'filing system wedge' ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter, verifier and 'sector' editor for use with the RAMdisc.

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Two commands, D and N, are worth mentioning to illustrate the usage. The former accesses the modem's telephone number store, and the latter instigates auto-dialling. Each command starts with AT, to grab the modem's *AT*tention, and commands may be strung together. ATN? will display the list of numbers currently stored, while ATDN12 will cause the modem to *D*ial the telephone number stored at *N*umber 12 in the list. It's as simple as that.

What should I look for in communications software?

Ease of use is the key, but as this is a subjective quality, it's always advisable to try for yourself or have a demonstration before buying. Most – in fact probably all – comms software packages are menu driven; that is, they can be run by selecting options from a series of menus. In this way no expert knowledge is required.

Look for the ability to 'configure' the software to perform in different ways, for example, to receive and send at different speeds. It is useful to be able to program a 'log on' string for sending automatically, to save a lot of repetitive keyboard work each time you make a call. This facility should be available from a menu option.

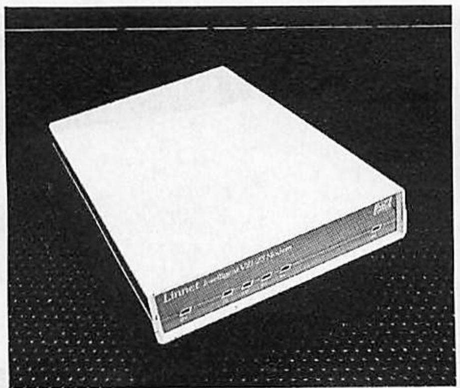
Opinions vary on the relative benefits of software on ROM or disc. A ROM is always available to be called, and in terms of access to the programs contained it is so fast as to be apparently instantaneous. But a disc is easier and cheaper to upgrade. Indeed, two of the companies behind software reviewed this month, PMS and BBC Soft, have their own dial-up services and propose to offer upgrades by telephone in the form of programs for downloading. I recall being sent software in this way when I reviewed the GEC Datachat modem for *AU* last year. The trouble of sending your software for exchange, and having to manage without for two weeks, does not arise.

Yes, I can feel myself crossing to the disc camp. . .

This is all very well, but what are the costs involved with modems?

The range is pretty wide. Approximately 120 modems are currently on the market, at prices varying from £26 to £795 (excluding VAT), and this is without taking into account specialised products that would be used in a mainframe environment. Of these 120, about 10 per cent (from five or six manufacturers) are well known through regular advertising.

The range of comms software packages



The Pace Linnet – reviewed on page 90

is not as wide, but there is still some choice. Prices range from £12.95 to £89.95 (including VAT), with a few in the middle in the £30 to £40 range. Some software is linked exclusively to a particular modem, an example being Acorn's Prestel Adaptor – a V23-only modem – which has its own software on a ROM chip. In such cases modem and software are sold together at an all-inclusive price.

What is electronic mail?

Electronic mail, or 'email' for short, is one of the more self-explanatory pieces of terminology to come out of the growth in computer communiations. As a subscriber to an email service (such as Telecom Gold, Easylink or One-to-One) you would have a unique membership code, the mailbox number, to which mail could be directed and read by you alone.

What is a viewdata?

Viewdata is the term given to the method of displaying information as frames, or pages of information made up of text, or graphics or a mixture of both, like the BBC micro mode 7.

Teletext TV screens use the same format – the word 'videotext' has been coined as the generic term which embodies both teletext and viewdata. The difference between the two media is that teletext is broadcast, but viewdata frames are specifically selected by telephone. This telephone link means that, unlike teletext, viewdata is to-way, or interactive. Thus it is possible to purchase goods and manipulate your bank account from your keyboard and see the results on the displayed frame.

Viewdata services are operated in various European countries to different standards. In the UK the best known is Prestel, which provides a service to both business and individual users.

Frame selection on Prestel is by a tree structured menu system. Option one on the main menu may lead to a secondary menu of, say, zero through nine. Thus we may select frames 10,11,12. . . to 19. Each will lead to another set of options; eg, from 18 we may select 181,182,etc. And so on. We may go straight to a frame number by keying its multi-digit reference. A criticism that was made of Prestel is that subject selection by keyword was unavailable, but this has now been added to the system.

Anyone with a modem and some software with a viewdata option may have a look at Prestel by dialling the local access number (available from BT) and keying 4444444444 (that's 10 fours) as the ID followed by 4444 as the password. This leads into a demonstration tour showing the type of information on the database.

What is a bulletin board?

A bulletin board is a free-access system operated by one of a philanthropic species known as a sysop. The system consists of a microcomputer, a modem with auto-answer capability, some specialist software and some disc storage, preferably plenty of disc storage. The better boards use a dedicated phone line, separate from the sysop's private line, to allow the system to work round the clock.

Most bulletin board systems cater both for open messages which may be read by anyone and for private messages to individuals (email).

But good though BBs are – and without doubt some are very good, with their sysops having things well organised – there is inevitably the frustration factor of dialling all night to find the number engaged. With around 50 calls per day they can be engaged for most of the 24 hours.

It is this frustration more than anything else which first makes one see the advantages of paying a few pounds per month to be sure of going on-line first time, every time. There are other sophistications, of course, which make it worthwhile. Certainly, that there is room for free access systems, commercial electronic mail services and viewdata all to co-exist with their own identity.

How can I join?

You can join a bulletin board simply by using it. Many charge a voluntary registration fee, but instructions are given 'on-screen'. For BBC micro owners, Prestel is best joined via Micronet – there are numerous press ads. And BT Gold: this can be joined by joining Microlink, or directly. For further details ring 01-403 6777.



THOROUGHLY MODERN MODEMS

Before you can enter the world of electronic communications, you need some basic equipment

Jeff Ashurst

There is a great deal of communications equipment on the market and to the newcomer it can often be a daunting task selecting the appropriate models. Here we present some views of popular machines and specialist communications software chosen with the beginner in mind.

The Linnet is Pace's intelligent modem in the popular price range. It fills the market slot which used to be occupied by the Nightingale, still a popular model. My impression was that it made my Nightingale, itself a good non-intelligent modem, look like a steam-powered model by comparison. This is not to detract from the Nightingale, which now sells at a reduced price; it simply serves to emphasise the rate of development of modems at the moment.

The Linnet is an 'intelligent' modem, with its own processor and memory. Auto-dial, with either pulse or tone dialling, and auto-answer if required, are catered for by the hardware. This modem will automatically adjust to the transmission rates of the terminal and of the remote system. Both V21 and V23 protocols are supported, ie, transmit/receive rates of 300/300 and 1200/75 baud respectively.

Physically, the Linnet is a neat, flat, pale grey box measuring 160 by 35 by 242 millimetres. With the exception of a recessed reset button in the rear panel, there are no manually set switches. All control of the modem is via software, using the popular Hayes command set. Because different computer manufacturers use different connectors, Pace makes no attempt to supply a cable. You can pay to have one made for you, of course, but it's quite easy to make your own.

The Hayes commands make modem operation simpler than ever before (see the examples in the question and answer session on page 89). This is a first class product which I was very sorry to send back after the review.

The Linnet sells for £139 plus VAT, inclusive of the *Commstar II* communications software package.

Pace Series Four

Pace's flagship product, the Series Four, is a sophisticated Hayes-compatible modem available in three models. The 2123 will operate at 300 duplex or 1200/75 baud (like the Linnet), the 1200S adds 1200 duplex (V22 standard) to these and the 2400S will also work at 2400 duplex (V22 bis).

Externally, the Series Four is unique. It has a wedge shaped case which tapers from five centimetres to zero at the rear, with a breadth and depth of 300 and 225 mil-

limetres respectively. A bank of 10 lights near the leading edge monitors the line status and data flow, and a second bank shows the carrier strength. At front-left, a 32-character liquid crystal screen relays call progress information when going online, before reverting to its default display of day, date and time. The computer connects to the modem by a 25-way D-connector, as with the Linnet. In the rear panel the Series Four also has a printer port. It may be left in auto-answer mode, connected to a printer, to act as a printing terminal.

The Series Four uses the same command set as the Linnet, but has a few more features. For example, its memory will store 64 telephone numbers rather than 32.

The Series Four price range starts with the 2123 at £265 plus VAT. The 1200S is listed at £399 plus VAT whilst the 2400S is £499 plus VAT. As you see, there is a heavy premium to pay for extra speed. If you don't need the extra, there is little justification in buying a 2123 model when you can have a Linnet for much less. A Series Four, however, does have an upgrade path: the lowliest Series Four can be modified right up to V22 bis standard.

Modem Master

Modem Master from BBC Soft is a disc-based package providing both scrolling terminal and viewdata software. Like many other packages, *Modem Master* is menu-driven. It is very easy to use, and has helpful messages like 'Just a moment. . .' to reassure you that something is happening. File transfer, both up and downloading, is supported by this versatile software with the option of either ordinary text or the proven XMODEM error-checking protocol.

If required, access to this software may be controlled with a user-defined password, which is demanded on booting the disc.

Selecting the Utilities option from the main menu leads into a series of options to configure the software. Entry to Utilities can be protected by the user's password.

Headings include Set Defaults which works on parameters such as send/receive rates, line feeds and word formats. Other headings are Edit Database, List, Edit, Delete or Add new services up to a maximum of 20 each. Information stored about each service includes a log-on string which is sent automatically on connection. I found that this package gave the fastest auto-log on of any software.

Communications software typically consists of main data handling routines plus a modem driver program to prompt the user to dial manually or to activate your modem's auto-dial facility, where applicable. A driver is specific to a particular modem type. To its credit, *Modem Master* comes with no less than seven different drivers for most of the popular types of hardware, from the latest Hayes-compatible products, like the Linnet and Series Four reviewed



***Modem Master*: a disc-based program**

here, through software-driven auto-diallers such as the Pace Nightingale right through to manual dial modems.

It is clear that a lot of thought has gone into producing *Modem Master*. There are several appealing features quite apart from its primary attributes. For example, it is supplied on a 40-track disc but with a program which will convert the disc to 80-track format if preferred. It can be *MOVEd to an ADFS disc. It can be translated, again using a program supplied, into a sideways-RAM version. These last two will both run faster than the DFS version. Yet another useful item on the disc is a text file giving a list of telephone numbers of bulletin boards and viewdata systems in the UK, organised by region.

Modem Master costs an incredible £12.95 including VAT! At that price it undercuts every comparable package on the market.

Dialup Personal

Dialup Personal is one of a family of communications software packages with specific features tailored to suit the needs of different groups. Hence we have *Dialup Personal*, *Educational* and *Commercial* with *Professional* to follow. Another possibility is an international variant, to accommodate the differing viewdata standards of the UK, and Europe. The *Dialup* family is available in versions compatible with a wide range of popular microcomputers.

PMS obviously anticipates its sales to be more to organisations than to individuals. Not that any individual would be less than pleased to use this software. Again, it uses the progressive menu approach, with current selection and options available displayed clearly in a three-box format.

A myriad of services is listed in the directory. Instead of Prestel being one entry, many of Prestel's specialist services are interviewed separately, with log-on strings leading straight to the relevant frames. For example, Prestel Education, Banking Review and so on.

Dialup Educational costs £89.95 including VAT. It is also available as a package with the Miracle WS4000 modem. The price includes future upgrades and the use of PMS Dialink database.

CommSoft

The latest offering from SoftMachinery is *CommSoft*. This software consultancy was the first company to develop a viewdata telesoftware terminal for the BBC micro, on the occasion of the Micronet launch in 1982. Other versions of SoftMachinery's work have been marketed by various companies including Acorn themselves – the Prestel Adaptor ROM – Tandata, Communitel and Prestel Education. More recently, the Magic Modem and Voyager modems have been sold with SoftMachinery firmware. *CommSoft* is the latest development of this well-proven package, and is marketed directly by its authors.

The software can be used to good effect when dialling manually, but it really excels if used with a modem with an auto-dial board. Modem driver software is available on disc for a selection of popular modems. I tried both the Pace Nightingale and Magic Modem versions.

A file can be set up, following instructions in the manual, to send a log-on string for rapid access to dial-up services. Once set up, this file is usable without alteration with different modem drivers, a fact probably appreciated most by reviewers! It does, however, serve to emphasise the degree of flexibility of this package, which never constrains the user.

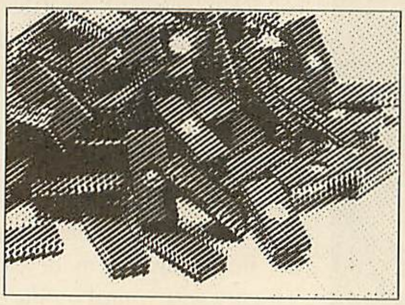
In a similar manner to *Modem Master*, *CommSoft* provides an instant on-screen help display using f0 to show all the current f-key assignments, rendering a paper f-key strip superfluous.

Pace Micro Technology, Allerton Road, Bradford BD15 7AG.
BBC Software, BBC Enterprises Ltd, 80 Wood Lane, London W12 0TT.
Sue Froggatt, PMS Communications Ltd, Norfolk House, Smallbrook Queensway, Birmingham B5 4LJ.
SoftMachinery, 68 Botley Road, Oxford OX2 0BU.

TUBELINK

AU OFFER

Toolkit ROM and utilities disc



Here is yet another special offer to *Acorn User* readers from Tubelink, a part of Prestel Microcomputing. **AutoROM, MemBuf,** and **ROMBuf**, a set of three utilities offering both outstanding quality and value for money. **AutoROM** can be used to compile ROM images containing any number of your own programs, up to a total of 16k in length! The image is then blown into EPROM or loaded into Sideways RAM and used with the ROM filing system. **MemBuf** and **ROMBuf** allow any section of RAM to be set up as an extended printer buffer so you don't have to wait for your printer. The program is suitable for BBC B, B+, Master and Compact.

The Tube Toolkit ROM: The ultimate utility ROM for the second processor user. It contains powerful memory transfer functions allowing any block of memory to be copied quickly from one processor to the other; a full 65C02 disassembler; Tube memory editor; and a versatile printer buffer function. Toolkit ROM is ideal for Acorn 65C02 and Turbo co-processors.

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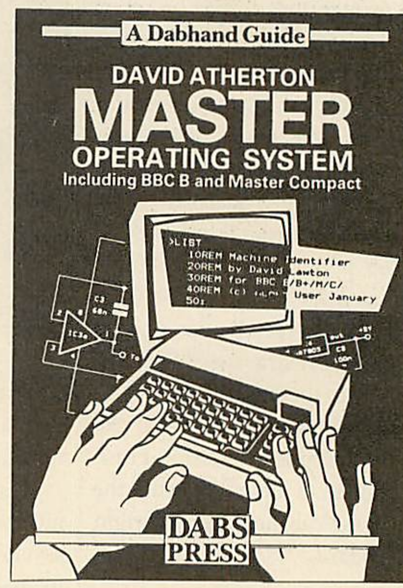
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MOS GUIDE

AU OFFER

Guide to Master operating system



This new book from Acorn expert David Atherton, is the definitive reference work for programmers of the BBC model B+, Master 128, and Compact computers. It also contains much material for BBC model B and Electron users.

It covers all features of the Acorn MOS including 65C12 opcodes (including Rockwell additions), all new system calls and previously unpublished filing system notes.

The book is liberally sprinkled with program listings, which are available on disc. The *Programs Disc* also contains some extra utilities.

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HEARD IT ON THE GRAPEVINE

Bulletin boards are a cheap and fun way of sending messages and programs

Ben Rietti

I can draw a parallel between the slogan in the window of my local pizza shop and the world of electronic communications: once bitten, twice back! And nowhere is this more true than with the electronic version of the old cork bulletin boards.

Just as Acornsoft's *Elite* made a big impact on BBC micro users all those months back, now more than ever the communications fad is setting in. Time spent at the dinner and dance is replaced by a single telephone call. This is how computer wire-heads now socialise – and who can blame them?

There are now hundreds of electronic notice boards around the country – in the form of bulletin boards. For the computer user, all it takes is a telephone call through a modem to the local bulletin board and a message can be displayed for all successive callers to read. It is also possible, on many boards, to send private messages between board users, just as you would on a national service such as Prestel.

There isn't much to setting up a bulletin board, all you need is a micro with a fast storage device and modem with telephone line. When it is up and running, all you need is a few callers to get the momentum going, and before you know it, you will have a thriving club on your hands with regular meetings, albeit computer to computer! In fact these bulletin boards are generally maintained by younger people as a hobby. It is always very interesting to meet and hear about different people, and bulletin boards serve this very purpose in a unique way – and are useful for gossip.

With the introduction of cheaper and better quality modems into the market, it is hardly surprising that you find databases and bulletin boards clocking up faster and faster baud rates. Indeed, British Telecom's widely used Telecom Gold electronic mail service has taken advantage of the 1200 baud full duplex system for quite some time, and Prestel are just about to introduce V22bis ports (that's a rate of 2400 baud) to its many lines. This will bring information to users at twice the speed, and, theoretically, halve your phone bills. I do have my doubts on this last point; I think it is more likely to encourage much more prolonged use of the system!

ETIQUETTE

- When you're dialled into a board and especially if you are using a single-line board, don't waste time. Get the information you require as quickly as possible so that other users waiting can get through.
- Never be put off by the monotonous engaged tone – if callers are considerate enough, you should be able to get through very soon.
- If a board offers downloadable programs, remember that there will almost certainly be an upload option. Don't just take information, help others by sending in your own programs or those you know to be 'public domain'.
- Don't use obscene language on messages, or make comments that could be offensive to others – it deters callers and is generally unpleasant for everyone.
- Always use yor real name, and don't try to log on as someone else.
- When logging off, use the correct procedure as described on each particular board. If you simply hang-up your modem without telling the host system that you wish to leave, you may render it unusable for other callers. Only disconnect your modem when instructed to.

Not content with the standardised message area, bulletin boards now tempt callers with even more facilities. A popular addition to the main menu when calling is the download section. Here, public domain software is available for callers to collect. In many cases these programs are small utilities written for personal use by other callers, which are found to be of great benefit to other computer users.

There are obvious snags to offering software on bulletin boards; not everyone can handle the particular downloading system, so the latest trend is to offer callers a choice of methods, and so in this way bulletin board host software is gradually becoming more sophisticated.

Boards are currently being linked to each other to enable messages sent on one system to be transferred and read by callers on another board. This has been implemented successfully by Musictel, a new range of boards specific to music lovers. It is really ideal for linking together specific interest groups, who would not otherwise have much contact. Small groups obviously lack the advantage of being part of one large system. Via Musictel, ideas can be shared among a larger audience of people with similar tastes.

Funding is the main obstacle for a sysop – that's the name given to the person who is in charge of a particular bulletin board, the SYStem OPerator. Without sufficient financial backing, it would mean giving up your own use of a computer and phone line when the board is operating, and if the board is to be popular and well read, it must be available at regular times to suit the callers. Large companies have taken advantage of this and are now sponsoring bulletin boards. They supply the necessary

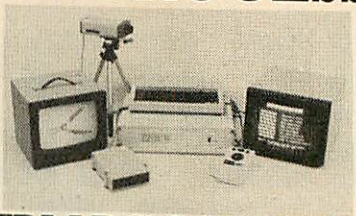
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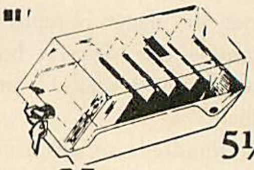
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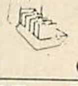
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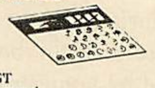
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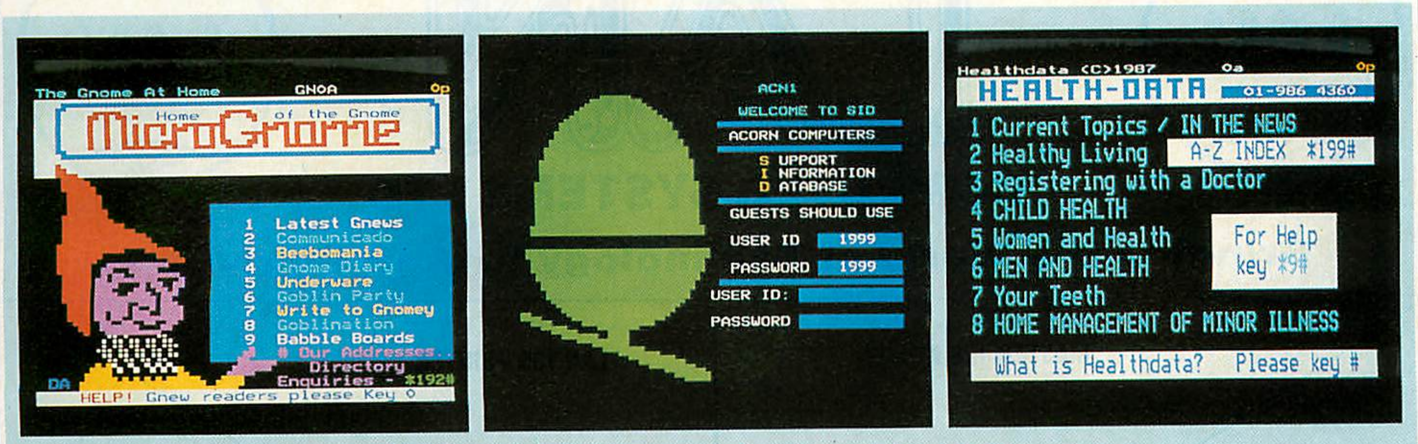
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Bulletin boards take many forms. The Gnome at Home (left) can provide varied programs and chat; others serve as technical help lines (centre) or community databases (right).

equipment for the job in return for the sysop placing details about the sponsor's products on the board. In some cases, callers can even place credit-card orders via a bulletin board, which would then be passed on to the respective company.

Apart from the popular scrolling type of bulletin board, many enthusiasts run viewdata boards – these can be dialled into by anyone with software suitable for Prestel. In many respects this format is clearer and easier to manage, with logical routing systems and the chance to add graphics and colour to boards. Indeed, several systems are not content with just one system or the other, and now detect what software the calling computer is using and configure themselves accordingly.

The viewdata standard was enforced by the introduction of Prestel several years ago, and since then, companies such as Communitel have produced software packages for the BBC micro that turn the computer into powerful viewdata host systems, with feedback facilities and page editors. The Gnome at Home system took this software further and is now rated as one of the best bulletin boards in the country. The Gnome at Home is run on a network of BBC micros. It provides several dial-up lines for the service, and offers real-time chatting and electronic mail between users, together with programs, communications news articles and babble board where users can leave general messages to the public on any subject they care to babble on about! To cover their enormous running costs, Gnome at Home offers regular callers a nominal subscription charge, which entitles them to the full range of services. This includes the facility to edit their own pages on the board, which is normally unavailable to the non-paying caller.

Among boards which have survived the inevitable financial problems, there are several which have become very popular. The most innovative and enjoyable one is the Gnome at Home, as mentioned above, which has its own rather unique and fun style. It has a pedigree of sorts too; it started life as a database on the Viewfax section of Prestel. For the more health-conscious user, there is the increasingly popular Healthdata service. Again it is a viewdata-based system supplying a whole range of well laid out material on many aspects of health, covering symptoms, causes, and cures of illnesses. There is a wealth of information here, and is well worth a regular 'visit'.

Tel No.	Name	Baud rates and general info
01-888 8894	Gnome at Home	1200/75, viewdata, (24-hour)
01-986 4360	Health data	1200/75, viewdata, (24-hour)
01-346 7150	Marctel	1200/75 and 300, viewdata/scrolling, (24 hour)
01-648 0018	MBBS Mitcham	1200/75 and 300, (24-hour)
01-450 9764	Technoline	1200/75, viewdata, (24-hour), commercial
(0223) 243642	Acorn's Board	1200/75, viewdata, (24-hour)
(0247) 467863	Fido Bangor	1200/75,300/300,1200/1200,2400/2400, (24-hour)
(0384) 239944	Dudley College	1200/75, viewdata, (24-hour)
(0622) 850440	Swafax	1200/75, viewdata, (24-hour), satellite info

The phone numbers of some popular boards

The specialist boards are often the most interesting, and one such system based in Northern Ireland is 'Fido Bangor' – a scrolling board offering hints, tips, and downloadable programs for many computers. These include some excellent public domain utilities for MS-DOS micros, which can be used with the Master 512 co-proceessor.

Local computer groups often set up their own bulletin boards, and in small communities and towns, they often come up with high attendances and a good deal of correspondence and participation on the messaging sections. Marctel, run by 14-year-old Marcus Anselm in north west London has been around for quite some time. It boasts a large number of regular callers. MBBS Mitcham and the Channel Islands based Jersey Fido board are similar in this respect.

It is very important to remember that it is not cheap to call long-distance boards, so it is worth investigating to find out whether there is a board operating in your area. If so, and assuming you have the vital modem, take an active part in it, and encourage others to do so.

Bulletin boards are a cheap and fun way of exchanging information and programs (not to say gossip) between computer users – so use them.

Check out the User Groups pages in *Acorn User* for further information on local computer clubs and groups.

ON-LINE LETTERS

Sending messages around the country by computer is fast, flexible – and cheap too

Steve Mansfield

As someone who spends most of his day with his ear pressed to a telephone receiver, I have trouble finding the words to express my joy at using the phone system. The person I dial is usually either on the phone already or not there. And there are those late night flashes of inspiration when I just have to communicate my thoughts, only to find that everyone's in bed and not amused about being woken up. What fun!

I could always write a letter, of course, but that's assuming that the message isn't urgent. It's no accident that the post has been christened the 'snail mail'. The answer is to let computers do the hard work. Electronic mail – or email – solves these problems, and quite a few others.

The most common and popular email systems work on a common principle. Using your modem and communications software, you log on to a remote host computer, write your message and address it, using the recipient's mailbox code. The system then deposits the message in the mailbox awaiting the recipient's next call. When the person next logs on, he or she is told that there is a message waiting.

This has several advantages over phoning. The person doesn't need to be in when you send the message, you don't have to wait until office hours or even until morning, the message can usually be prepared off-line using a wordprocessor and it is delivered very quickly.

Unfortunately, there are two main drawbacks to email. The recipient has to be on the same system as you – although this is changing. And if the person doesn't log on for several days it will take that long to receive the message.

The main problem is deciding which of the many systems to use. Even if you limited the choice to those systems being marketed for micro users, it is still difficult to choose between the various rivals.



Epnitex – a new rival to Prestel in the electronic mail market

The first form of electronic messaging most home micro users come across is the mailbox feature on Prestel. The ability to send messages to other Prestel users is regarded by some as a bonus, by others as an essential part of the system.

Specially for micros

The majority of computer users who join Prestel also join the Micronet section. This carries news and features aimed at micro enthusiasts, as well as downloadable software. The BBC micro is particularly well covered, and the huge popularity of Micronet means that you'll find a lot of like-minded people using the system for this purpose.

Sending messages to them is very easy. Typing *7# takes you to the mailbox area from which you can select standard messages, which range from simple flowery borders to seasonal greetings cards. Just give the mailbox number of the person you want to send the message to and type any text. Some software packages allow you to prepare the message off-line. For short messages and letters this is fine, but entering text can be a bit of a pain. Unless you take care, words can be split across lines and there isn't a lot of room for text – so long messages have to be divided into page-size chunks in order to fit.

Some of these restrictions will be removed with a new on-line service called Epnitex. This is being launched as a rival to Prestel and, although it is still a page-based viewdata system, it incorporates some advanced editing features in its Epnimail section. It's message page can be used like a wordprocessor – it's possible to insert or delete text, it has proper word wrap and text and graphics can be entered horizontally or vertically. Epnitex is aimed mainly at the business market, but home subscriptions will be available. Telecom Gold is now

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For more than two years, Commstar has dominated the BBC communications software market. Now, Pace have introduced Commstar II, more powerful, more flexible and even easier to use. Many new facilities like 'pull-down' windows and menus have been added to Commstar's already impressive list of features.

Commstar II is compatible with BBC Model B, B+ and Master Series. Commstar II is still only £29.57 plus V.A.T. and comes complete with a comprehensive instruction manual and a years free subscription to Microlink on Telecom Gold.

Existing users of Commstar can upgrade to the new version for only £12.00, plus V.A.T.







Nightingale V21/V23

The Nightingale modem has become the standard by which other low cost modems are judged.

Combining simplicity of use with true multi baud rate operation, Nightingale can provide access to both viewdata (1200/75 & 75/1200 baud) and full duplex (300/300 baud) systems.

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Linnet V21/V23

Linnet sets new standards in modem performance by combining many facilities, previously available only on 'professional' modems, in a single versatile yet affordable product.

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Advanced micro-processor control and Hayes compatibility make it suitable for use on any computer with an RS232 port and it will operate virtually any terminal software.

All features including Automatic dialling are initiated via simple commands entered at the terminal and Linnet's comprehensive tone detection facilities allow full call progress monitoring via English-like messages such as "NO CARRIER" and "NO DIALTONE". Successful calls are notified via the "CONNECT" message common to Hayes modems.

Series Four V21/V23/V22/V22 bis

The last word in microcommunications, Series Four models include as standard V21/23 CCITT capability coupled with 'intelligent' microprocessor control.

Auto dial/auto answer, auto speed buffering, auto baud rate detection, LED carrier strength indicator, 64 number memory and LCD display are amongst features too numerous to mention here, which make Series Four modems the first choice for business and professional applications.

All models are Hayes compatible, they will support multiple baud rates. All Series Four models include as standard V21/V23 and V22 (1200/1200 baud) and V22bis (2400/2400 baud) versions are also available.

Further information on these and other Pace products is available from good dealers everywhere, or direct from Pace.

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rapidly gaining popularity. With Telecom Gold you don't get the snazzy colour graphics and friendly menus that come with Prestel and Epnitex, but you do get a far more powerful system.

Gold was set up from the start as a messaging system. To use it you need standard scrolling terminal software – nothing fancy as the Telecom Gold system is quite old. In order to make the most of Gold you need to learn its language. There is a large set of commands to master which make the system both powerful and difficult for the newcomer.

You can use Gold like an extension of your micro. Files can be saved on the system, which could include ASCII versions of program listings as well as text files. The system has its own text editor – a rather crude wordprocessor which can be handy for editing the set-up files. These tell the system how you'd like it to behave, including things like how wide you want the screen, how to handle word wrap, whether to pause at the bottom of each page of text and so on.

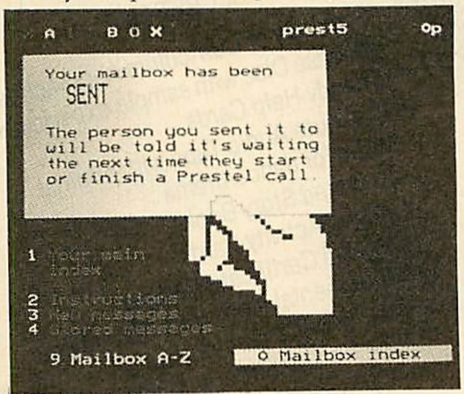
The messaging part of Gold is its strong point. There is no real limit on the size of message you can send, indeed some long *Acorn User* articles have been sent to us over the Gold system.

It's easy to set up a name file, called Mail.Ref, so that you can address a mailbox using a single name, rather than having to remember the full mailbox number each time. For example, *Acorn User*'s mailbox number is 81:RED001. By putting 'AU 81:RED0001' in the Mail.Ref file you can address mail to us by typing AU.

You can ask the system to hold delivery of the message until a particular date or time, you can label a message as 'Express', in which case it goes to the top the recipient's pile of waiting mail.

One of the most useful options when sending messages is the acknowledgement feature. Putting a simple command into your text means that you will be send a brief message by the system when the recipient has read the message. You can even demand that the person replies immediately, and as soon as they finish going through the text the system goes into send mode ready for a reply from them.

The easiest way to do all this is to prepare the message off-line with a text editor. The edit program in the Master is excellent for this as the file it produces is straight ASCII text. The finished file can then be uploaded on to Gold and saved as a file in your directory, or you can load it straight into a message. Receiving text is pretty sophisticated too. Whenever you log on or off you're told how many read and unread messages you have. Rather than reading the full text it's possible just to scan through the headers, which tell you who the message is from, when it was sent and a single line what the describing message is about. Once you have read the message you can delete it, file it under a name of your choice or reply. Typing 'reply' puts you straight into the text edit mode, with the mailbox address already set up for sending the reply directly.



Using Prestel for email

One of the biggest attractions of Gold is its international coverage as it's part of the Dialcom System which runs in a large number of countries.

Each Gold host computer has a number. This is what the '81' refers to at the start of the *Acorn User* mailbox number. It means system 81. But that doesn't mean you can only send to other people on system 81. So long as you include this system prefix number when you address a message, you can send it to any Telecom Gold or Dialcom system around the world.

Of course, Telecom Gold isn't the only system around. There are others, like One-to-One, but for micro users there is one big advantage in Gold – and that's the use of Microlink. Microlink is a special interest group, using Gold system 72 as its host, but with a number of useful extras and it's also much cheaper than a standard Telecom Gold account.

The Microlink area has its own bulletin board, computer news section and downloadable software, with a large selection for the BBC micro. There are also gateways to other systems, such as the Mnematics board in the US. You still get the full Telecom Gold facilities, including on-line games and access to additional services like the *World Reporter* database.

There is one other form of email which is virtually free. Bulletin boards often allow you to send private messages to a named person, as well as the more usual function of posting general messages. However you rely on the person dialling into that particular board and getting through to some boards can be very tricky – they're almost always engaged. But if you want to swap messages with just a few other people, and you can come to some kind of mutual agreement over which board you want to use, then bulletin boards do provide a very inexpensive means of communication.

Cost is obviously a major factor when deciding which system to use. A Micronet subscription scores well here. You pay a quarterly fee – part of which is for Prestel, the rest for Micronet – but there are no times changes if you use the system during off-peak hours, and then most of the pages cost you nothing extra.

Microlink charges a standing fee plus time charges. Services like *World Reporter* also levy a fee, and can be very expensive. As a guide, my bill for Micronet costs me roughly £12 a month, although I do use Microlink a lot more.

One other major factor which determines the usefulness an email system is the number of other people who use it. Some headway is being made in linking up the various systems but for the most part you'll want to use a system which is shared by the people you're most likely to want to send messages to. For the time being that rules out Epnitex, as until it gets going there simply won't be enough people on it.

If you simply want to send messages to friends you won't need the sophisticated electronic mail features of Telecom Gold, so subscription to Micronet might well be the best option. But for businesses and any serious applications, Microlink on Telecom Gold is by far the best electronic mail choice if you want a service specifically for computer users.

ADDRESSES

Micronet: 8 Herbal Hill, London EC1R 5ES. Tel: 01-278 3143.

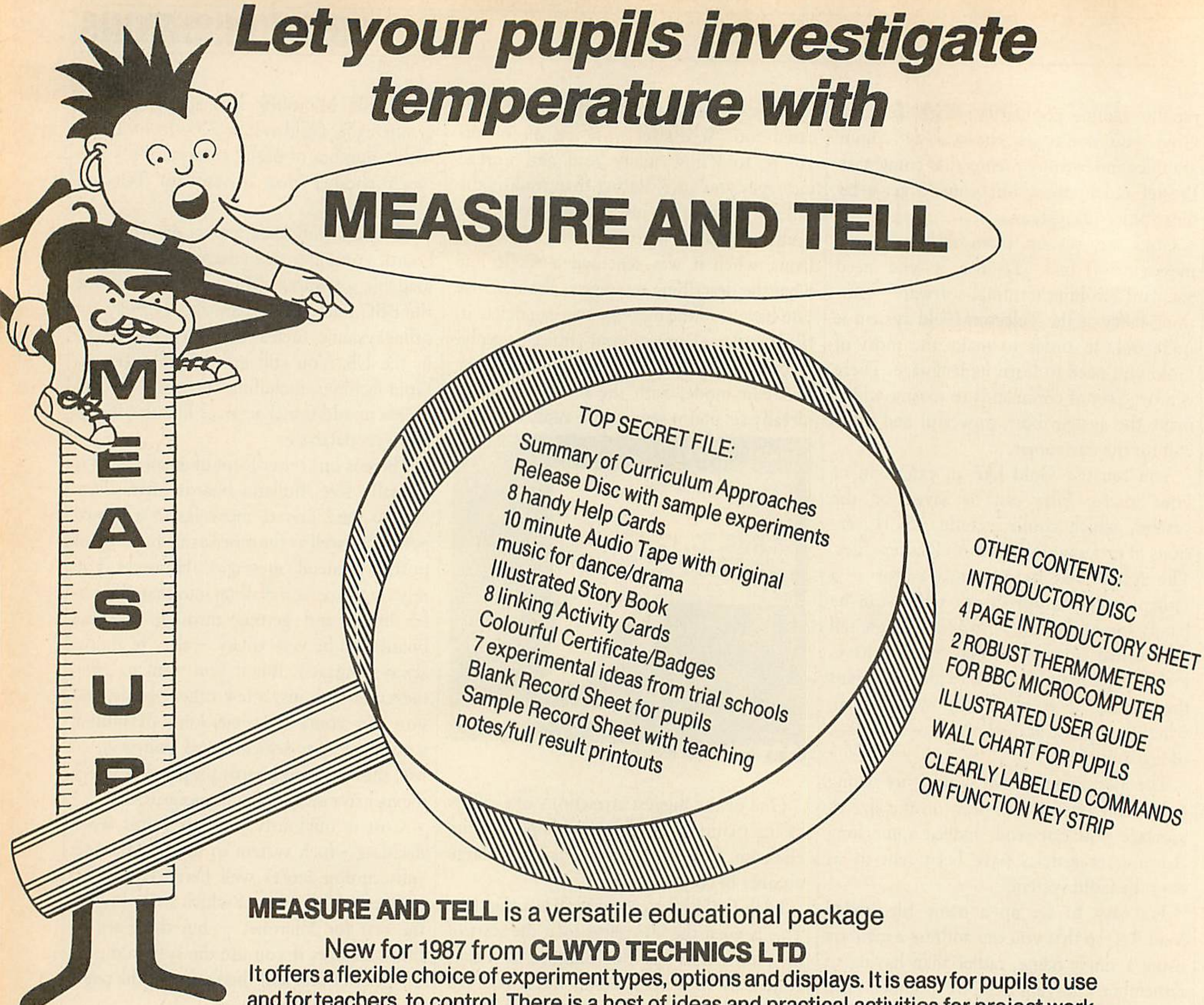
Prestel: Telephone House, Temple Avenue, London EC4Y OHL. Tel: 01-822 1122.

Telecom Gold: 60-68 St Thomas Street, London SE1. Tel: 01-403 6777.

Microlink: Database Publications, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. Tel: 061-456 8383.

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SIX INTO ONE WILL GO

You can still use your old DFS files with your new Master 128 with this useful program

John Knight

So there I was, with my trusty model B replaced by a smart new Master 128, the twin 40 track disc drives replaced by a double-sided 80-track drive (to get the best out of ADFS) and a box full of discs collected over the past few years.

After the initial excitement and combined strangeness and familiarity had reduced a little, the first job was to transfer all those files from 40-track single-sided DFS discs to 80-track double-sided ADFS discs. The increase in capacity per floppy meant that I could expect to get six or more reasonably full 100k DFS discs on one 640k ADFS disc.

So how to do it? I could LOAD and SAVE each individual file, but apart from being prone to errors and incredibly brain-numbing, this method cannot handle files larger than available memory.

Right, time to consult the manual. Oh look, it's easy – '*MOVE-DISK-filename-ADFS-filename' should do the trick. It does – if you have two drives.

There is of course the Acorn utility 'Copyfiles' supplied on the Welcome disc, which, while being very flexible and coping with all filing systems, is a right pain when it comes to transferring more than one file at a time as it requires such a lot of key-pressing and supervision.

So what we single-drive owners really need is a program to soak up as many files as possible from the DFS disc, allow the discs to be swapped and write the files out to the ADFS disc, with as little user intervention as possible. This is what the listing on the yellow pages (for the B+128 and Master 128) will do. Additionally, DFS to DFS backup is available, and use is not restricted to single drive systems. What it will not do is organise your ADFS discs for you – only you know what they contain and what is the best way of organising it.



Use your old programs on your new machine

The method used consists of extracting all filenames from the DFS catalogue, reading each in turn and storing as much as possible in the 64k of sideways RAM (SWR). The program performs most impressively when a large number of small files are being transferred and when all 64k is available, but it will handle files larger than available memory and detect how much sideways RAM can be used. The program will work with no sideways RAM at all and so could be amended for model B owners with ADFS – but the necessary changes are considerable.

What is needed

Only the SWR present in machines from the B+128 onwards can be used. The reason for this is that the 'pseudo-addressing' option of OSWORD 66 is used. This is the convention invented by Acorn that allows you to treat SWR as a continuous block rather than four 16k chunks. For a good introduction to this kind of sideways RAM see the First Byte article by Tessie Revivis in *Acorn User* April 1987. The other kinds of SWR (Solidisk or UserRAM, for example) do not support OSWORD 66 as far as I know. Shadow memory is not required but B+128 users will need to reduce the size of variable 'buffersize' to about 13000 as REMarked in the listing, to overcome the higher value of PAGE. It also works with the Compact if you have a 5.25-inch drive and a copy of 1770 DFS.

How to use

When the program is run it first examines the sideways RAM to determine how much can be used. If you have a ROM-image in one of the banks, say the first, then obviously three are available. If, however, it is in the second then only two banks are available as the bank in use separates the first from the third and fourth. The RAM banks used must be a continuous sequence.

If any banks are occupied the program performs a *ROMS to list the contents and then gives two options: either continue with the empty banks, or switch off to clear any ROM-images present. Of course, if a 'real' ROM is present then the former option will be used.

The next step is to select the type of backup operation required, either DFS to DFS or DFS to ADFS. The program will then prompt you for the source disc and start reading files from it. When storage space within the program has been filled, it will begin writing files to the destination disc. If only one drive is used, a prompt to swap the discs will appear, and if ADFS is the destination filing system the program will at this point ask you for the name of a

FUNCTION AND PROCEDURES

FNtwobytes This returns a 16-bit number from the next two consecutive memory locations to be examined. It is used by PROCaddresses which interprets the DFS catalogue information.

PROCramtest Its main purpose is to decode R%. This is set before any procedures are called. This is because the OSCLI ('SRDATA') commands could cause an error if a RAM bank is occupied, and after an error Basic loses track of all of the procedures and functions. The four banks of RAM can each be in use or available, which means 16 different configurations are possible, giving 16 values in R%. This is convenient to treat as a hexadecimal number which will then fit into a one-character string, which in turn simplifies the detection of the number of banks and the pseudo-address 'srstart'.

PROCbegin Sets up the arrays and the variable 'buffer only' using an alternative method to 'IF srsize= −1 THEN buffern only= TRUE ELSE buffern only=FALSE'

PROCerr Detects and ignores error 131 (RAM occupied); reports errors associated with bad filenames.

PROCconfigure Sorts out what filing systems are needed and how many disc drives will be used. The variable 'onedrive' is set up by a cunning trick that means 'if the drive numbers are both odd or both even then onedrive=TRUE'. If you need to copy to and from drives on the same spindle, eg, drives 1 and 3 or 0 and 2 then just set onedrive=FALSE.

PROCcopy Apart from issuing prompts, this procedure just calls the PROCs that do the real work.

PROCcatalogue This calls routines to extract filename, directory, load and execution addresses and file size, for each of the files on the disc.

PROCfilename Builds a string of up to seven characters containing the filename.

PROCdirectory Finds the directory letter and masks out the bit that may be set if the file is locked with 'AND &7F'.

PROCaddresses Interprets the compacted numbers that represent file size, load and execute addresses.

PROCinput Checks file size, sets up a string containing drive, directory and filename, and calls PROCloadbig if the size exceeds the size of the buffer or PROCloadsmall otherwise. Proceeds with the next file if any are left and if there is room in sideways RAM.

PROCloadsmall *LOADs files and calls the routine to store them in sideways RAM. The only reason for using *LOAD is that it's faster.

PROCloadbig Opens the larger files as a data file and reads as much as it can, either the amount of sideways RAM left, the amount that will fit in the buffer, or the amount of the file that is left from previous attempts.

PROCnewinput Initialises the pointer in the read control block and the number of bytes to be read (big files only).

PROCramio Does the equivalent of SRWRITE or SRREAD. That is, it moves data in or out of sideways RAM, depending on the parameter 'type' passed to it, and alters the pointer to the start of the data, 'srbase'.

PROCoutput Much the same as PROCinput. Calls PROCoutputdrive.

PROCoutputdrive Switches to the destination filing system.

PROCoutputdir Called from PROCoutputdrive for ADFS. Sets the currently selected directory to that selected by the user. If this is file number 1, it calls PROCfetchdir to get that directory.

PROCoutputname Modifies the ADFS filename to include the DFS directory name from the source disc.

PROCwritesmall, PROCwritebig, and **PROCnewoutput** Complementary to PROCloadsmall, loadbig, and newinput respectively.

PROCattributes Modifies directory entries with load and execute addresses and ensures file is unlocked.

PROCfetchdir Asks for the directory name for ADFS copies. Checks that the name is not in use as a filename, or is present as a directory, or, if absent, creates a directory with that name.

PROCdiskio Reads or writes parts of files using the read or write control blocks in PROCmccode.

PROCsectors Loads the two sectors containing catalogue information into memory for analysis, reads the file count to detect empty discs.

PROCreturn Prints the message string passed on it and waits for the Return key to be pressed.

PROCmccode Allocates space for disc I/O control blocks and code for checking ADFS directories.

directory into which it can put the files.

Directory names entered should be of the format '$', or '$.name' or 'name', the last two being equivalent and preferable. There are several reasons for this. Firstly, copying all files into the $ directory would in most cases be a serious waste of space since the directory would become full long before the disc ran out of space.

Secondly, each directory under ADFS consumes 1280 bytes, and we don't want to go overboard and waste space with loads of almost empty directories.

Thirdly, and most importantly, it is intended to give a logical grouping to the files transferred to one disc.

If you have two disc drives you can now sit back and watch it all happen; if not, then all you have to do is stay alert enough to put the right disc in when the program asks. All the files from the source disc will be copies to the destination disc.

When transferring to ADFS, in order to keep the processing simple, any files not in the '$' directory on DFS have their names modified to include the directory.

For example if files are being transferred to directory $.Arcade:

$.PROG becomes $.Arcade.PROG

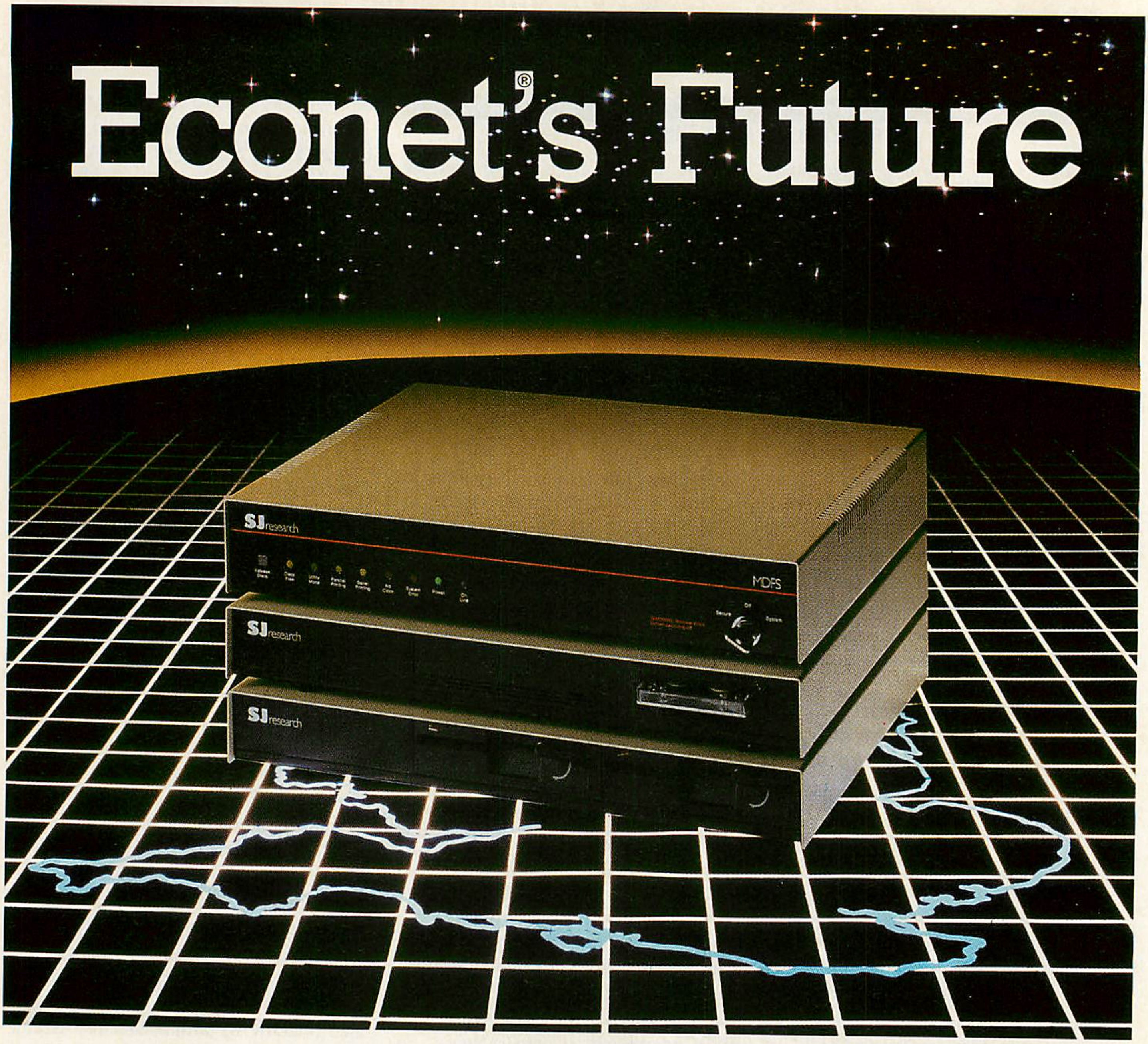
BPROG becomes $.Arcade.B_PROG (rather than $.Arcade.B.PROG which would need another sub-directory).

The program deliberately keeps the directory tree only one level deep. If it is absolutely essential for the file to be called B.PROG then directory B should be created (*CDIR B) within directory Arcade and then '*RENAME B_PROG B.PROG'.

When disc filing systems first became available for the Beeb, the names you chose for your files could contain characters that are now unsuitable for filenames – for instance the hyphen. The more recent filing systems are fussier about what they allow. Consequently it is quite possible to come across a filename that is no longer suitable, which will cause an error at run-time.

The approach I have taken to this problem is to let the filing system detect these names – why extend an already long program with code to check filesnames when the code to do that is present in the ADFS? If one of these names is encountered the the program will stop with a message asking the user to alter the particular filename in question.

Normal precautions should be taken with the discs used – write protect the source disc and ensure the destination disc is formatted and has enough space on it.



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COMPUTERISED HIEROGLYPHICS

Many applications require special symbols and signs to be printed. Your dot-matrix printer can do this

Brett Laniosh

Like many other micro users I would be lost without a wordprocessor. As a teacher, the ability to produce and edit documents, worksheets and letters so easily is a great help. But like many specialist users, I often need more than A to Z, zero to nine and the remaining standard symbols which appear on the BBC micro's keyboard and screen for use in my worksheets. The limitations of character set also apply to most printers. But if you have a dot-matrix printer, all is not lost. It is possible to define any symbol and get it printed on paper. The following article describes how to get user-defined symbols into print from *InterWord*, *Wordwise +* and *Wordwise* wordprocessors. You will however need a printer that can handle bit-image graphics. Generally any Epson-compatible printer will do. The defining of characters was described in Hints & Tips in *Acorn User* September 1986, page 50.

To define a special character, the first job is to draw out the symbol on a grid of 8 by about 10 or 11. This will be the matrix on which the symbol is drawn. The second number is not critical, because the symbol can be as long as you want! The height of the symbol is limited to 8 dots.

By shading in the squares a symbol can be built up – a Greek *pi* symbol is shown in figure 1. Don't worry too much about jagged edges; the relatively small size of the symbol means any rough edges will be lost. When the symbol is complete, the printer codes need adding up. Each code is a total of one vertical column. For instance, column three in the *pi* symbol is calculated as 2+4+8+16+32=62. The codes are placed in order running from left to right.

To send the symbol to the printer the bit-image mode needs switching on. This is

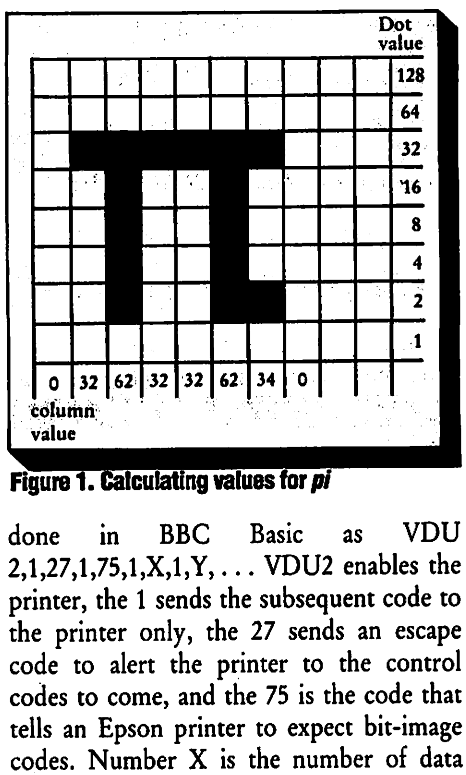


Figure 1. Calculating values for *pi*

done in BBC Basic as VDU 2,1,27,1,75,1,X,1,Y,... VDU2 enables the printer, the 1 sends the subsequent code to the printer only, the 27 sends an escape code to alert the printer to the control codes to come, and the 75 is the code that tells an Epson printer to expect bit-image codes. Number X is the number of data bytes that follow MOD 256 and Y is the number of data bytes DIV 256. For these special characters, Y will always be zero; make X equal to the number of codes or columns in the character. With *pi* this is VDU 1,8,1,0. The remaining codes are entered into the line following Y. Therefore, for *pi*, the full Basic statement is:

```
VDU 2,1,27,1,75,1,8,1
,0,1,0,1,32,1,62,1,32,1,
32,1,62,1,34,1,0,3
```

Strange results will occur if the wrong number of codes are sent to the printer especially if, say, 10 codes are expected and only nine are received.

If the above statement is typed into Basic, the *pi* symbol should be printed. If not, check the line has been entered correctly. If this still does not produce results then either you will have to consult your printer manual for the correct bit-image code and enter it instead of 75, or your printer does not support bit-image mode.

Assuming all is well, we can integrate the symbols into the wordprocessor.

Wordwise

The codes will have to entered as an OC embedded command at the required place in the text. For example, to produce the *pi* symbol the line would look like this:

```
f1 OC27,75,8,0,0,32,6
2,32,32,62,34,0 f2
```

The f1 and f2 are the embedded command start (green) and stop (white) codes. To save the tedium of entering the string of codes a Basic program could be made to define the function keys to produce the symbols by pressing CTRL/Shift and the required function key. For example:

```
   10 REM key 0 pi
   20 *KEY 0 !!!OC27,75,
8,0,0,32,62,32,32,62,34,
0!!"
   30 REM key 1 omega et
c...
   40 :
  100 *WORDWISE
```

Note the strange characters at the start and end of the line. These will produce the embedded start and end command codes.

Wordwise +

The method used for *Wordwise* can also be used for *Wordwise +*. Owners of *Wordwise +* also have the advantage of a programming language and segments. Both can be used to hold a segment file which stores the codes. The segment program in listing 1 will ask you to select a symbol and then it will drop it into your text at the position of the

PRINTING SYMBOLS

cursor. The segment needs to be typed, saved and then loaded into segment 0 and it is called by pressing Shift with f0.

InterWord

InterWord has embedded commands like *Wordwise*, but they need to be used in a different way. The embedded command menu needs to be called up from text mode by pressing f1. The printer codes are inserted under the line titled 'Control codes'.

Using bit-image mode in *InterWord* presents a few problems. First, the string of codes cannot exceed the 30 spaces allowed in *InterWord*'s embedded commands. Second, codes in the sequence 33 to 126 often need coverting to ASCII format. For example 27,75 will become 27,"K". This is rather a nuisance, but it does mean that long strings of numbers can be shortened for example, 27,75,5,0,64,64,97,126,63 becomes 27,"K",5,0, "@@a¯?". The ASCII format for a number can be found by the Basic statement PRINT CHR$(X), where X is the code to be converted.

Because of the length limit, it is wise to place no more than eight codes in any one embedded command. This presents us with our first problem. Embedded commands with only eight codes are not very useful for entering medium or wide symbols. In order to overcome this, two or more embedded commands are laid on top of each other! In other words, the symbol is split into sections and each placed in its own embedded command; for most cases this will be two halves. When defining the second half of the symbol's code, it will be necessary to prefix all subsequent codes by a backspace (Epson control code 8). If this is not done, the symbol will be split by a space.

An example to produce the symbol *beta* would be to first calculate the bit-image codes. For *beta*, they are:

```
27,75,8,0,0,1,127,84,
84,84,40,0
```

Now split the codes into two groups. Add a backspace 8 to the second group:

```
27,75,4,0,0,1,127,84

8,27,75,4,0,84,84,40,0
```

Then convert codes 33-126 to ASCII:

```
27,"K",4,0,0,1,127,"T"

8,27,"K",4,0,"TT(",0
```

From the text mode of *InterWord*, press f1 and enter the first half of the embedded command; by the 'arrow' return character. Press Return and Escape back to the text. Move the cursor along one space and enter the embedded command for the second half of the code. The codes can be left like this but by deleting the space between the two embedded commands it is possible to make them only take up one space. Think of the embedded commands as playing cards stacked on top of another. As with playing cards where you can only see the top card, so you can only change the top command. If you want to alter commands 'underneath' you will need to remove the embedded command that lies on top. For this reason it is best not to stack embedded commands until they have been checked properly.

To make life easier, it is possible to define a function key to load all your pre-defined symbols when you need them. First put all your symbols on one file using *InterWord* like this:

```
¦EC alpha
¦EC beta
¦EC pi etc...
```

Where EC is the embedded command. Notice the space between the EC and its description. Leave a line between each EC. The pad character ¦ is needed at the start of each of the ECs.

When all the symbols are entered, save this in file 'SYMBOLS'. The function keys are best entered from Basic before word-processing begins. Two keys are needed, one to select the required symbol and the second to transfer the symbol to the correct part of your text. The cursor-up and cursor-down keys are defined by:

```
    *KEY 15 ¦[*IW.1SYMBOL
S¦M¦[¦!¦O
    *KEY 14 ¦Z¦[*IW.O¦M:I
W.1:GETMARKED(C)¦M*IW.1¦
M:CANCEL¦MY¦M*IW.O¦M¦[¦!
```

When a symbol is required pressing CTRL/Shift and 'up' key loads the symbols into *InterWord* package one, and from there the required symbol is chosen and selected by placing the cursor over the ¦ character at the start of the relevant line, and pressing CTRL/Shift and 'down' key. The user is returned to the original text with the embedded command in place.

Note that the length of a line cannot exceed 255 characters including embedded commands. This should be only a problem if more than a couple of symbols are put on one line.

There you go, you now have all the information for your character designs.

DECIMAL CODES

α 27,75,8,0,12,18,18,20,14,18,18,0
γ 27,75,6,0,0,156,98,98,156,0
λ 27,75,9,0,64,66,36,24,8,4,2,2,0
β 27,75,8,0,0,1,127,84,84,84,40,0
Ω 27,75,9,0,0,2,50,78,64,78,50,2,0
δ 27,75,11,0,0,6,10,18,34,66,34,18,10,6,0
π 27,75,8,0,0,32,62,32,32,62,34,0
μ 27,75,5,0,127,4,4,120,0
√ 27,75,9,0,24,12,6,254,128,128,128,128,0
+/− 27,75,5,0,34,34,250,34,34
÷ 27,75,7,0,7,8,8,42,8,8,0
© 27,75,8,0,126,129,189,165,165,165,129,126

ASCII CODES

α	27,"K",4,0,12,18,18,20	8,27,"K",4,0,14,18,18,0
γ	27,"K",6,0,0,156,"bb",156,0	
λ	27,"K",4,0,"B$",24,@	8,27,"K",5,0,8,4,2,2,0
β	27,"K",4,0,0,1,127,"T"	8,27,"K",4,0,"TT(",0
Ω	27,"K",9,0,0,2,"2N@N2",2,0	
δ	27,"K",5,0,0,6,10,18,34	8,27,"K",6,0,"B",34,18,10,6,0
π	27,"K",4,0,0,32,">",32	8,27,"K",4,0,32,">",34,0
μ	27,"K",5,0,127,4,4,120,0	
√	27,"K",4,0,24,12,6,254	8,27,"K",5,0,128,128,128,128,0
+/−	27,"K",5,0,34,34,250,34,34	
÷	27,"K",6,0,8,8,"*",8,8,0	
©	27,"K",4,0,"~",129,189,165	8,27,"K",4,0,165,165,129,"~"

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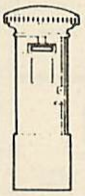
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'ARTROOM...the best there is.'—Acorn User Feb '87

'ARTROOM is the software for you.' A & B Jan '87

ACE consists of two programs. COLOURIZER enables you to produce MODE 1 colour versions of ARTROOM screens and to dump them to a printer using a shaded printer dump. The MODE CONVERTER program will convert any graphics screen into a Mode 4 ARTROOM screen ready for loading into ARTROOM. Conversions can be made from Modes 0,1,2,5 and 7, yes SEVEN!

...very pleased with the way Clares have introduced the colour facility.' A & B June '87.

ARTROOM and ACE will work with any mouse but we recommend DIGIMOUSE because it is well engineered using a non-slip ball and optical encoders. DIGIMOUSE also includes the unique 'LINEAR LOCK' facility that enables you to draw straight lines freehand.

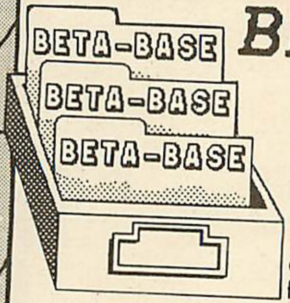
...impressed by Nidd Valley Digimouse' A & B June '87

This complete package is marketed by Olivetti in Italy, the home of style and design.

ACE A STROKE OF GENIUS!



BETA-BASE — SAVE £7



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The Beta-Base pack consists of Beta-Base, the number one database for the BBC micro, and Beta-Base Utilities which extends the power of Beta-Base.

The main feature of Beta-Base is its ease of use which is achieved without sacrificing the power and flexibility required for the efficient manipulation of up to 65,000 records.

The Beta-Base Utilities provide seven new utilities. There are more powerful versions of Search and Sort and there is also a Mail Merge program which creates perfectly formatted letters containing data from your files.

'We use Beta-Base ourselves' Mike Bibby, Editor of MICRO USER.

'Rated best value for money'—ACORN USER Dec '84

When ordering please state the following:
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N.B. If ordering for a Master or Compact please state DFS or ADFS. The ARTROOM pack is for the Master or Compact only but all other software is available for all machines.

RAMROD UTILITIES PACK — SAVE UP TO £30



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The UTILITIES PACK consists of RAMROD and MACROM. RAMROD is the ultimate toolkit ROM and it is compatible with the whole BBC range and includes a disassembler plus editors for DFS, ADFS, RFS, memory, Shadow memory, Sideways RAM, Tube plus lots more. RAMROD will take you to the furthest reaches of your machine and enable you to boldly go where no ROM has gone before!

'an ingenious collection of utilities...' BEEBUG Oct '86

'worth its weight in gold.' A & B Jan '87

MACROM is a fast full featured MACRO ASSEMBLER that allows the use of macros, which are loaded from disc. MACROM has its own easy to use editor which automatically formats your source code. A HI version of MACROM is supplied for use with the second processor. A macro library and demonstrations are also supplied.

'Full marks for an excellent product.'—BEEBUG JUNE 1986

We are also making BROM+ available under this offer. Its main feature is the full scrolling BASIC editor which allows the user to edit a program as if dealing with text in a wordprocessor. There are many other features dedicated to making life easier for BASIC programmers.

'This is the best BASIC screen editor I have so far used.' —MICRO USER August 85

For BROM+ add £25 on ROM, £20 for 5.25 inch disc or £22 for 3.5 inch disc.

Fontwise + Pack — SAVE £10

£30 5¼ inch Disc £34 3½ inch Disc

The FONTWISE+ pack contains FONTWISE+, the FONT EDITOR and 22 fonts. FONTWISE+ enables you to print very high quality text in a choice of 22 different fonts and 3 sizes. You do not need a special printer, just an EPSON RX or FX compatible. High quality is not the end of the story because you can also have both proportional and justified text. The output has to be seen to be believed.

FONTWISE+ is compatible with WORDWISE, VIEW, INTERWORD, MINI OFFICE II and EDWORD II.

'FONTWISE is better than many NLQ packages'—ACORN USER Sept '86

The FONT EDITOR is very easy to use and allows you to edit the current fonts or create new ones. Reviewers have praised the editor for its ease of use and faultless presentation.

'editor is impressively quick, smooth and easy to use'—A & B

EDITOR '...puts all previous designers to shame.'—BEEBUG July '86

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COMPETITION

HAPPY BIRTHDAY TO US

After sixty issues *Acorn User* is celebrating its fifth birthday. To celebrate we are offering some of the best BBC software

Graham Bell



Spiderman swings into action with *Pagemaker*

This is *Acorn User*'s fifth birthday issue, and so the competition is something a little special. The questions are based on the past issues of *Acorn User* itself, and for prizes, we have selected five of the best items of 'landmark' BBC micro software from the last five years.

The programs chosen were all innovative packages when they were introduced, extending the abilities of the BBC micro. But they have also stood the test of time; they are still among the most popular programs of their type.

The programs are in five categories; business, education, music, graphics, and games. Each winner will receive a set of each of the selected packages.

■ **Business** Acornsoft's *ViewSheet* was one of the first ROM-based spreadsheets, and the original version is still among the most capable of business programs available.

■ **Education** Logotron Logo has become the standard version of Logo for the BBC micro, so much so that Acorn now supply it with the Master Compact. It is widely used in schools throughout Britain.

■ **Music** The Island Logic Music System is a musical 'wordprocessor', enabling you to compose and play your own tunes.

■ **Games** No choice really, it has to be *Elite*, by Superior/Acornsoft!

■ **Graphics** AMX started the trend for Windows, Icons, Menus and Pointers on the BBC micro. Their AMX *Pagemaker* is a fine introduction to desktop publishing for anyone.

The questions are base on the last few issues of *Acorn User*. All the questions can be answered from this issue or the issues published during the last six months.

Questions

1)   Which *AU*s are these cover sections from?

2) What fixed the problem with *Kiddie Art* on a Compact?

3) Name three sporting personalities to feature on recent Games review pages.

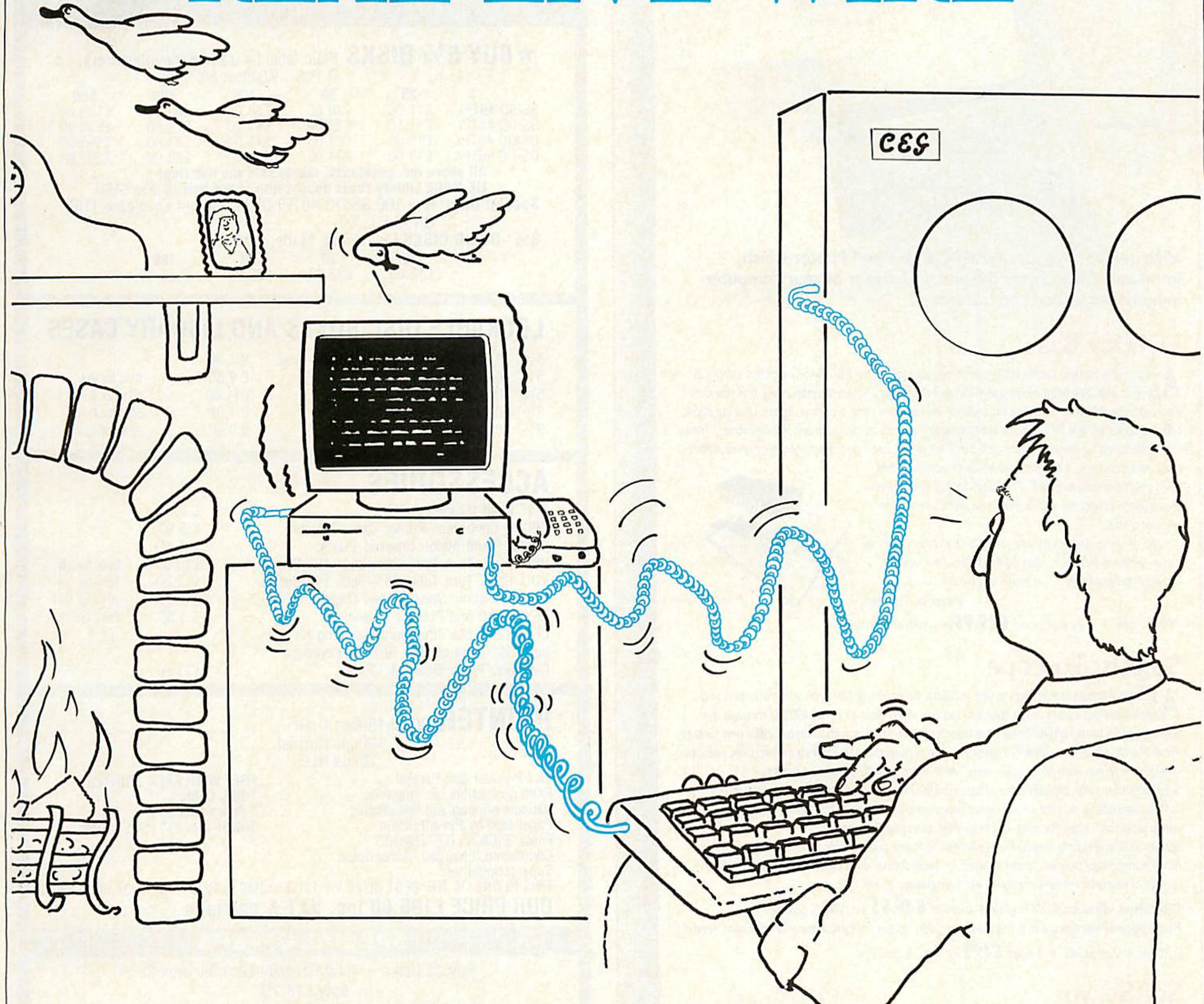
4) When was the first article describing fractal graphics published in *Acorn User*, and who was it by?

5) *Acorn User* can be contacted on BT Gold. What is our mailbox number?

Write your answers on a postcard or a sealed envelope and send them to: July Competition, *Acorn User*, Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF, to arrive not later than July 13, 1987.

Note: the Editor's decision is final.

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YELLOW PAGES

INDEX/COMPATIBILITY

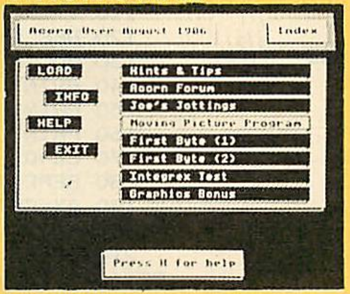
Entering listings

To make the task of entering listings easier, *Acorn User* has adopted several standards in the yellow pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the yellow pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the yellow pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating systems OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide an easy-to-complete 'How To Enter' box.

Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. If you still have difficulties, you can also send off for a list of *Checksums* which help you find the errors. Send a large sae (26p stamp) to *AU*Checksums, PO Box 641, London NW9 8TF.

DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 131 for details of how to order.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips											
Listing 1	114	■	■	■	■		■	■	■	■	■
Listing 2-3	114	■	■	■	■	■	■	■	■	■	■
Acorn Forum											
Listing 1	115	■	■	■	■	■	■	■	■	■	■
Listing 3	115	■	■	■	■			■	■	■	■
Listing 4	114			■	■			■	■	■	■
Listing 5	114		■				■	■	■	■	■
Joe's Jottings											
AIV programs	116			■1,2			■	■	■	■	■
Six into One Will Go	118		■	■	■3			■	■	■	■
Computerised Hieroglyphics	121	■	■	■	■		■	■	■	■	■
Look before you Layout	121	■	■	■	■	■	■	■	■	■	■
Network Page (4)											
Listings 1-4,6	123	■	■	■	■		■	■	■	■	■
Listing 5	123			■			■	■	■	■	■

Notes 1. Requires Master AIV Domesday system 2. Listings 4 and 5 required Logotron Logo 3. Requires 1770 DFS ROM image and 5.25-inch floppy disc drive 4. All require Econet

YELLOW PAGES

HINTS & TIPS

See Hints & Tips, page 43

Listing 1. Day of the month routine

```
   10 REM Hints & Tips - Listing 1
   20 REM By Paul Skirrow
   30 REM For BBC B/B+/M/C/E
   40 REM (c) Acorn User July 1987
   50 :
   60 day$="SunMonTueWedThuFriSat"
   70 REPEAT
   80 INPUT "Day of month (1-31)? " date
%
   90 INPUT "Month (1-12)? " month%
  100 INPUT "Year (1900-2099)? " year%
  110 day%=FNday(date%, month%, year%)
  120 PRINT MID$(day$,(day%MOD7)*3+1,3)'
  130 UNTIL 0
  140 :
  150 DEF FNday(date%,month%,year%)
  160 LOCAL D%,loop%
  170 REM  Find day of week of Jan 1 of
 the year
  180 D%=(year%+((year%+3)DIV4)+5)MOD7
  190 REM  Find day of week for first of
 month
  200 IF month%=1 THEN 240
  210 FOR loop%=1 TO month%-1
  220 D%=D%+FNmonthlen(loop%,year%)
  230 NEXT
  240 D%=D%+date%-1
  250 =D% MOD 7
  260 :
  270 DEF FNmonthlen(month%, year%)
  280 LOCAL L%
  290 L%=31
  300 IF month%=4 OR month%=6 OR month%=
9 OR month%=11 THEN L%=30
  310 IF month%=2 THEN L%=28-((year% MOD
 4)=0)
  320 =L%
```

Listing 2. Calendar program

```
   10 REM Hints & Tips - Listing 2
   20 REM By Paul Skirrow
   30 REM BBC B/B+/M/C/E
   40 REM (c) Acorn User July 1987
   50 :
   60 INPUT "Month (1-12)? "month%
   70 INPUT "Year (1900-2099)? "year%
   80 PROCcalendar(month%, year%)
   90 END
  100 :
  110 DEF PROCcalendar(month%, year%)
  120 PRINT '"Sun Mon Tue Wed Thu Fri Sa
t"
  130 C%=FNday(1,month%,year%)
  140 day%=1
  150 REPEAT
  160 PRINT TAB(C%*4);
  170 PRINT RIGHT$(" "+STR$day%,2);
  180 C%=C%+1
  190 IF C%>=7 PRINT:C%=0
  200 day%=day%+1
  210 UNTIL day%>FNmonthlen(month%,year%
)
  220 PRINT:PRINT
  230 ENDPROC
  240 :
  250 DEF FNday(date%,month%,year%)
  260 LOCAL D%,loop%
  270 REM  Find day of week of Jan 1 of
 the year
  280 D%=(year%+((year%+3)DIV4)+5)MOD7
```

Continued ►

◄ Hints & Tips listing 2 continued

```
  290 REM  Find day of week for first of
 month
  300 IF month%=1 THEN 340
  310 FOR loop%=1 TO month%-1
  320 D%=D%+FNmonthlen(loop%,year%)
  330 NEXT
  340 D%=D%+date%-1
  350 =D% MOD 7
  360 :
  370 DEF FNmonthlen(month%, year%)
  380 LOCAL L%
  390 L%=31
  400 IF month%=4 OR month%=6 OR month%=
9 OR month%=11 THEN L%=30
  410 IF month%=2 THEN L%=28-((year% MOD
 4)=0)
  420 =L%
```

Listing 3. Default input routine

```
   10 REM Hints & Tips - Listing 3
   20 REM By Philip Hawthorne
   30 REM For BBC B/B+/M/C/E
   40 REM (c) Acorn User July 1987
   50 :
   60 CLS
   70 PRINT "Enter date ";
   80 title$=FNgetstr(20,"Monday 8th Jun
e")
   90 PRINT ''"Today is "title$
  100 END
  110 :
  120 DEF FNgetstr(len,old$)
  130 LOCAL A%,C%,A$
  140 PRINT "<";old$;
  150 PRINT SPC(len-LEN(old$));
  160 PRINT ">";STRING$(len+1,CHR$(8));
  170 C%=0
  180 REPEAT
  190 A%=GET
  200 IF A%<>127 THEN GOTO230
  210 IF C% <>0 THEN VDU127:C%=C%-1:A$=L
EFT$(A$,C%):ELSE VDU 7
  220 GOTO 260
  230 IF A%=13 THEN 260
  240 IF C%=0 THEN PRINT SPC(len);STRING
$(len,CHR$(8));
  250 IF C%<>len THEN C%=C%+1:A$=A$+CHR$
(A%):VDU A%:ELSE VDU 7
  260 UNTIL A%=13
  270 IF C%=0 THEN =old$:ELSE =A$
```

See Acorn Forum, page 53

Listing 1. Angled Text

```
   10 REM Angled Text
   20 REM by Garry S Smith - Forum Listi
ng 1
   30 REM for B/E/B+/M/C
   40 REM (c) Acorn User July 87
   50 :
   60 MODE 1
   70 VDU 19,1,0,0,0,0
   80 INPUT "Text : " W$
   90 INPUT "Size : " size
  100 INPUT "Angle : " angle
  110 CLS
  120 COLOUR 1
  130 PRINT TAB(0,0) W$
```

Continued ►

◀ Acorn Forum listing 1 continued

```
140 COLOUR 3
150 I%=32*LEN W$
160 Q%=(1279-I%*size)/2
170 GCOL 0,3
180 FOR H%=1 TO I% STEP 4
190 ang2=ang2+angle
200 FOR G%=991 TO 1023 STEP 4
210 X%=H%*size+Q%
220 Y%=G%*size+ang2-size*1000+300
230 IF POINT(H%,G%) P%=5 ELSE P%=4
240 PLOT P%,X%,Y%
250 NEXT G%
260 NEXT H%
270 END
```

Listing 3. OSWORD &7F results

```
 10 REM Correct OSWORD &7F results
 20 REM by A J Lindop - Forum Listing
 3
 30 REM for BBC B/B+/M/C with DFS
 40 REM (c) Acorn User July 1987
 50 :
 60 store=&900
 70 j%=store+&1A : REM .patch
 80 store?3=j% MOD &100
 90 store?4=j% DIV &100
100 start%=store+&6
110 FOR pass%=0 TO 2 STEP 2
120 P%=start%
130 [OPT pass%
140 STA store+2
150 STX &90
160 STY &91
170 LDA store+4 \ False addr
180 PHA
190 LDA store+3
200 PHA
210 LDA store+2
220 JMP (&900)
230 :
240 .patch \ New entry point
250 PHP
260 PHA
270 TXA
280 PHA
290 TYA
300 PHA
310 LDA store+2
320 CMP #&7F
330 BNE end
340 LDY #&6
350 LDA (&90),Y
360 LDY #&A
370 CMP #&57
380 BEQ res
390 LDY #&9
400 CMP #&56
410 BNE end
420 .res
430 LDA (&90),Y
440 CMP #&20
450 BNE end
460 LDA #&0
470 STA (&90),Y
480 .end
490 PLA
500 TAY
510 PLA
520 TAX
530 PLA
```

Continued ▶

◀ Acorn Forum listing 3 continued

```
540 PLP
550 RTS
560 ]
570 NEXT
580 ?store=?&20C
590 store?1=?&20D
600 ?&20C=start% MOD &100
610 ?&20D=start% DIV &100
620 END
```

Listing 4. Shadow screen demonstration

```
 10 REM Shadow screen demo
 20 REM by Dave Atherton - Forum Listi
ng 4
 30 REM for M128/Compact only
 40 REM (c) Acorn User July 87
 50 :
 60 MODE 0
 70 MODE 128
 80 MODE 0
 90 :
100 *FX 114,1
110 PROCswitch(1)
120 PRINT "MAIN SCREEN"
130 PROCswitch(2)
140 PRINT "SHADOW SCREEN"
150 IF GET
160 PROCpoke(1)
170 PROCpoke(0)
180 REPEAT
190 PROCswitch(1)
200 IF GET
210 PROCswitch(2)
220 IF GET
230 UNTIL FALSE
240 :
250 DEF PROCswitch(X%)
260 OSCLI "FX112,"+STR$ X%
270 OSCLI "FX113,"+STR$ X%
280 ENDPROC
290 :
300 DEF PROCpoke(X%)
310 OSCLI "FX108,"+STR$ X%
320 IF X%=0 THEN Z%=-1 ELSE Z%=1
330 FOR I%=&3A00 TO &3A00+639 STEP 4
340 !I%=Z%
350 NEXT
360 ENDPROC
```

Listing 5. Use of *FX 151

```
 10 REM Screen flicking for B+
 20 REM by Dave Atherton - Forum Listi
ng 5
 30 REM for BBC B+ only
 40 REM (c) Acorn User July 87
 50 :
 60 *FX 114 1
 70 MODE 0
 80 PRINT TAB(25,10)"This is the norma
l screen"
 90 VDU 22,128
100 PRINT TAB(25,20)"This is the shado
w screen"
110 REPEAT
120 *FX 151 52 128
130 IF GET
140 *FX151 52
150 IF GET
160 UNTIL FALSE
```

JOE'S JOTTINGS

See Joe's Jottings, page 81

Listing 1. Trackerball/Mouse demonstration

```
   10 REM Trackerball/Mouse demonstratio
n
   20 REM by Joe Telford
   30 REM for Master 128 AIV
   40 REM (c) Acorn User July 1987
   50 :
   60 *MOUSE
   70 MODE 128
   80 *POINTER
   90 REPEAT
  100 IF ADVAL9=2 THEN OSCLI("POINTER 2"
):MOVE ADVAL(7),ADVAL(8)
  110 IF ADVAL9=1 THEN OSCLI("POINTER 2"
):DRAW ADVAL(7),ADVAL(8)
  120 *POINTER
  130 UNTIL FALSE
```

Listing 2. AIV demonstration

```
   10 REM AIV demonstration
   20 REM by Joe Telford
   30 REM for Master 128 AIV
   40 REM (c) Acorn User July 1987
   50 :
   60 PROCboth
   70 PROCplay(1,2000)
   80 PROCaudio("ON")
   90 PROCm("Playing forward standard sp
eed with sound")
  100 PROCdelay(1500)
  110 PROCm("Play loop 6 times")
  120 PROCloop(6,50)
  130 PROCm("Slow forward")
  140 PROCsfwd:PROCdelay(100)
  150 PROCm("Slow Backward")
  160 PROCsbwd:PROCdelay(100)
  170 PROCm("Fast Forward")
  180 PROCffwd:PROCdelay(100)
  190 PROCm("fast Backward")
  200 PROCfbwd:PROCdelay(100)
  210 PROCm("Halt and select computer vi
deo only")
  220 PROChalt:PROCcomputer:PROCdelay(50
)
  230 PROCm("Select specific frame and j
oin video signals")
  240 PROCframe(13857)
  250 PROCboth
  260 PROCdelay(50)
  270 PROCm("Now kill computer video")
  280 PROCdelay(50)
  290 PROCvdisc
  300 PROCdelay(50)
  310 PROCplay(1000,1)
  320 PROCboth
  330 PROCm("Play in reverse with both v
ideo inputs selected")
  340 PRINT"DEMO ended!"
  350 END
  360 :
  370 DEF PROCm(m$)
  380 CLS
  390 PRINT m$
  400 ENDPROC
  410 :
  420 DEF PROCloop(times,gap)
  430 FOR loop%=1 TO times
  440 PROCstep("BWD",gap)
  450 PROCdelay(gap)
  460 NEXT loop%
```

Continued ►

◄ Joe's Jottings listing 2 continued

```
  470 ENDPROC
  480 :
  490 DEF PROCdelay(t)
  500 time=TIME+t*2.8
  510 REPEAT UNTIL TIME>time
  520 ENDPROC
```

Listing 3. Library routines

```
 1000 REM Library routines to drive the
AIVD
 1010 REM by Joe Telford
 1020 REM for Master 128 AIV
 1030 REM (c) Acorn User July 1987
 1040 :
 1050 DEF PROCframe(no)
 1060 OSCLI("SEARCH "+ STR$(no))
 1070 ENDPROC
 1080 DEF PROCplay(start,end)
 1090 OSCLI("PLAY "+STR$start+" "+STR$en
d)
 1100 ENDPROC
 1110 :
 1120 DEF PROCffwd
 1130 OSCLI("FAST 0")
 1140 ENDPROC
 1150 :
 1160 DEF PROCfbwd
 1170 OSCLI("FAST 255")
 1180 ENDPROC
 1190 :
 1200 DEF PROChalt
 1210 OSCLI("STEP 0")
 1220 ENDPROC
 1230 :
 1240 DEF PROCaudio(state$)
 1250 IF state$="ON" THEN *AUDIO 3
 1260 IF state$="OFF" THEN *AUDIO 0
 1270 ENDPROC
 1280 :
 1290 DEF PROCsfwd
 1300 *SLOW 250 0
 1310 ENDPROC
 1320 :
 1330 DEF PROCsbwd
 1340 *SLOW 250 255
 1350 ENDPROC
 1360 :
 1370 DEF PROCstep(dir$,step)
 1380 IF dir$="FWD" THEN OSCLI("STEP "+S
TR$step)
 1390 IF dir$="BWD" THEN OSCLI("STEP "+S
TR$(256-step))
 1400 ENDPROC
 1410 :
 1420 DEF PROCboth
 1430 *VP 3
 1440 ENDPROC
 1450 :
 1460 DEF PROCcomputer
 1470 *VP 2
 1480 ENDPROC
 1490 :
 1500 DEF PROCvdisc
 1510 *VP 1
 1520 ENDPROC
 1530 :
 1540 DEF PROChighl
 1550 *VP 5
 1560 ENDPROC
```

JOE'S JOTTINGS

Listing 4. To Telford Towers

```
TO KEY
PR "\<SPACE\>
PR "
MAKE "A RC
VDU [12]
END

TO JOURNEY1
TS CS HT PLAY 1 2000 WAIT 1500 UKSATPIC
VDU [17 1]
PR [Here is the UK.] KEY
BLOCKNORTH PR [The North!] KEY
NUK CS HT KEY PR [and the South!]
SUK SOUTH KEY SUK KEY
NUK PR [Lets look closer at the north!]
KEY NORTH PR [and from a satellite.]
NUKSATPIK KEY NORTH
PR [Eventually we reach Cleverland]
CLEVERLAND KEY CLEVESATPIC1
REPEAT 10 [CLEVESATPIC1 CLEVESATPIC2]
CLEVERLAND
PR [Where we can zoom down to the]
PR [Largest town....Middlesbrough.]
MBRO KEY TRANSPORTER
PR [You can see the transporter bridge]
PR [on the map.]
KEY DOCKS PR [can you see it on]
PR [this photo?]
KEY MBRO
PR [But any visit to Middlesbrough]
PR [or CLEVERLAND] CLEVERLAND
PR [would be missing something if we]
PR [didn't end up at the small hamlet]
PR [outside Telford towers]
TOWERS
END

TO NUKSATPIK
FRAME 18600
END

TO UKSATPIC
FRAME 18586
END

TO TOWERS
FRAME 13857
END

TO TRANSPORTER
FRAME 31338
END

TO MBRO
FRAME 20697
END

TO DOCKS
FRAME 17337
END

TO CLEVESATPIC2
FRAME 17335
END

TO CLEVESATPIC1
FRAME 17334
END

TO CLEVERLAND
FRAME 18967
END
```

Continued ▶

◀ Joe's Jottings listing 4 continued

```
TO SOUTH
FRAME 18797
END

TO NORTH
FRAME 18798
END

TO NUK
FRAME 18792
END

TO SUK
FRAME 18791
END

TO BLOCKNORTH
CS RECT 200 -225 400 360
END

TO RECT :sx :sy :x :y
PU HOME
SETPOS SE :sx :sy
PD REPEAT 2 [FD :y LT 90 FD :x LT 90]
PU
END
```

Listing 5. Logo utility words

```
TO SBWD
*SLOW 250 255
END

TO SFWD
*SLOW 250 1
END

TO SLOW :dir
*SLOW 250 :dir
END

TO BWD :dist
OP 256 - :dist
END

TO FWD :dist
OP :dist
END

TO HALT
*STEP 0
END

TO FFWD
*FAST 0
END

TO FBWD
*FAST 255
END

TO HL
*VP 5
END

TO BOTH
*VP 3
END

TO VDISC
*VP 1
END

TO COMPUTER
*VP 2
END

TO STEP :amount
*STEP :amount
END

TO AUDIO :state
*AUDIO :state
END

TO OFF
OP 0
END

TO ON
OP 3
END

TO PLAY :start :end
*PLAY :start :end
END

TO FINISH
*SEARCH 1
*EJECT
END

TO FRAME :no
*SEARCH :no
END

MAKE "A "Z
```

DISC FILING

See Six into One Will Go, page 101

Listing 1. Copyfiles

```
   10 REM Copyfiles-II
   20 REM by John Knight
   30 REM for BBC B+128 and Master
   40 REM (c) Acorn User July 1987
   50 :
   60 MODE 7
   70 ON ERROR PROCerr :L%=ERL+10 :GOTO
L%
   80 R%=0
   90 OSCLI("SRDATA W") :R%=1
  100 OSCLI("SRDATA X") :R%=R%+2
  110 OSCLI("SRDATA Y") :R%=R%+4
  120 OSCLI("SRDATA Z") :R%=R%+8
  130 PROCramtest
  140 PROCbegin
  150 REPEAT
  160 PROCconfigure
  170 PROCcopy
  180 UNTIL key$<>"Y" AND key$<>"y"
  190 END
  200 :
  210 DEF FNtwobytes
  220 lobyte=?(data+offset)
  230 offset=offset+1
  240 hibyte=?(data+offset)
  250 offset=offset+1
  260 =(hibyte*256)+lobyte
  270 :
  280 DEF PROCramtest
  290 VDU 31,11,0,141,130:PRINT "Copyfil
es-II"
  300 VDU 31,11,1,141,130:PRINT "Copyfil
es-II"
  310 VDU 28,0,24,39,3
  320 VDU 23,1;0;0;0;0;
  330 R$=STR$~(R%)
  340 banks=0
  350 IF INSTR("124589A",R$) THEN banks=
1
  360 IF INSTR("36BCD",R$) THEN banks=2
  370 IF INSTR("7E",R$) THEN banks=3
  380 IF R$="F" THEN banks=4
  390 IF INSTR("13579BF",R$) THEN srstar
t=0
  400 IF INSTR("26AE",R$) THEN srstart=&
3FF0
  410 IF INSTR("4CD",R$) THEN srstart=&7
FE0
  420 IF R$="8" THEN srstart=&BDF0
  430 IF R$="F" THEN GOTO 500
  440 *ROMS
  450 PRINT
  460 PRINT "Ram bank(s) occupied - (" ;
 banks ; " available),"
  470 PRINT "switch off to clear them, o
r "
  480 PRINT "press <Return> to continue.
.."
  490 REPEAT UNTIL GET=13
  500 ENDPROC
  510 :
  520 DEF PROCbegin
  530 srsize=(banks*16368)-1
  540 bufferonly=(srsize=-1)
  550 IF bufferonly THEN srsize=0 :srsta
rt=0 :srbase=0
  560 osword=&FFF1
  570 osgbpb=&FFD1
  580 osfile=&FFDD
  590 buffersize=15000 :REM 13200 for B+
128
  600 DIM data buffersize
  610 DIM dir$(31). file$(31)
```

Continued ►

◄ Copyfiles (listing 1) continued

```
  620 DIM load%(31), exec%(31), size%(31
)
  630 DIM block 20, osstring 30
  640 DIM ioblocks 40, drive$(1)
  650 DIM system$(1), name$(1)
  660 in=0 :out=1
  670 store=&C0 :restore=&40
  680 VDU 23,1;0;0;0;0;
  690 PROCmccode
  700 ENDPROC
  710 :
  720 DEF PROCerr
  730 IF ERR=131 THEN ENDPROC
  740 REPORT
  750 PRINT ;" in line ";ERL
  760 IF ERR=248 OR ERR=214 OR ERR=204 T
HEN PRINT "(";name$(out);") Please chang
e name & rerun"
  770 END
  780 :
  790 DEF PROCconfigure
  800 CLS
  810 PRINT '"Please select task require
d :"
  820 PRINT '"1) Copy files from DFS ->
ADFS or,"
  830 PRINT '"2) Copy files from DFS ->
DFS."'
  840 REPEAT
  850 INPUT " "key$
  860 UNTIL key$="1" OR key$="2"
  870 system$(in)="DISC"
  880 system$(out)="DISC"
  890 link$="."
  900 IF key$="1" THEN system$(out)="ADF
S" :link$=""
  910 :
  920 PRINT '"Enter the source drive num
ber ";
  930 REPEAT
  940 INPUT " "key$
  950 UNTIL INSTR("+0123",key$)>1
  960 drive$(in)=key$
  970 :
  980 PRINT '"Enter the destination driv
e number ";
  990 REPEAT
 1000 INPUT " "key$
 1010 UNTIL INSTR("+0123",key$)>1
 1020 drive$(out)=key$
 1030 A%=VAL(drive$(in))
 1040 B%=VAL(drive$(out))
 1050 onedrive=((A% MOD 2)=(B% MOD 2))
 1060 ENDPROC
 1070 :
 1080 DEF PROCcopy
 1090 PRINT
 1100 PROCreturn(">> Insert the source d
isc & ")
 1110 PROCsectors
 1120 PROCcatalogue
 1130 startfile=1
 1140 ?readhandle=0
 1150 ?writehandle=0
 1160 REPEAT
 1170 PROCinput
 1180 IF onedrive THEN PROCreturn(">> In
sert the destination DISC & ")
 1190 PROCoutput
 1200 IF onedrive AND fileno<=filetot TH
EN PROCreturn(">> Insert the source DISC
 & ")
 1210 UNTIL fileno>filetot
```

Continued ►

◀ Copyfiles (listing 1) continued

```
1220 PRINT '''"Copy complete - any more
(Y/N)"
1230 INPUT ""key$
1240 key$=LEFT$(key$,1)
1250 ENDPROC
1260 :
1270 DEF PROCcatalogue
1280 FOR fileno=1 TO filetot
1290 offset=(8*fileno)
1300 PROCfilename
1310 PROCdirectory
1320 offset=&100+(fileno *8)
1330 PROCaddresses
1340 NEXT
1350 ENDPROC
1360 :
1370 DEF PROCfilename
1380 string$=""
1390 char=0
1400 REPEAT
1410 byte$=CHR$(?(data+offset+char))
1420 valid=(byte$>" " AND byte$<="~")
1430 IF valid THEN string$=string$+byte
$
1440 char=char+1
1450 UNTIL char>6 OR NOT valid
1460 file$(fileno)=string$
1470 ENDPROC
1480 :
1490 DEF PROCdirectory
1500 offset=offset+7
1510 dir$(fileno)=CHR$(?(data+offset)AN
D&7F)
1520 ENDPROC
1530 :
1540 DEF PROCaddresses
1550 load%(fileno)=FNtwobytes
1560 exec%(fileno)=FNtwobytes
1570 size%(fileno)=FNtwobytes
1580 extrabyte=?(data+offset)
1590 extras=extrabyte AND &C0
1600 REM bits 7 & 6
1610 addon=0
1620 IF extras=&80 THEN addon=&20000
1630 IF extras=&40 THEN addon=&10000
1640 IF extras=&C0 THEN addon=&FF0000
1650 exec%(fileno)=exec%(fileno)+addon
1660 extras=extrabyte AND &0C
1670 REM bits 3 & 2
1680 addon=0
1690 IF extras=&08 THEN addon=&20000
1700 IF extras=&04 THEN addon=&10000
1710 IF extras=&0C THEN addon=&FF0000
1720 load%(fileno)=load%(fileno)+addon
1730 extras=extrabyte AND &30
1740 REM bits 5 & 4
1750 addon=0
1760 addon=extras*&1000
1770 size%(fileno)=size%(fileno)+addon
1780 ENDPROC
1790 :
1800 DEF PROCinput
1810 *DISC
1820 fileno=startfile
1830 srbase=0
1840 REPEAT
1850 bytes=size%(fileno)
1860 name$(in)=":"+drive$(in)+"."+dir$(
fileno)+"."+file$(fileno)
1870 srend=(srsize-srbase<bytes) AND (b
ytes<=buffersize)
1880 IF srend  THEN GOTO 1900
```

Continued ▶

◀ Copyfiles (listing 1) continued

```
1890 IF bytes> buffersize THEN PROCload
big ELSE PROCloadsmall
1900 UNTIL fileno>filetot OR srend
1910 ENDPROC
1920 :
1930 DEF PROCloadsmall
1940 PRINT "Loading ";name$(in)
1950 OSCLI "LOAD "+name$(in)+" "+STR$~d
ata
1960 PROCramio(store)
1970 fileno=fileno+1
1980 ENDPROC
1990 :
2000 DEF PROCloadbig
2010 IF ?readhandle=0 THEN PROCnewinput
2020 ?readhandle=OPENIN(name$(in)).
2030 PRINT "Opened input ";name$(in)
2040 REPEAT
2050 bytes=srsize-srbase
2060 IF bufferonly OR (bytes>buffersize
) THEN bytes=buffersize
2070 IF bytes>readtotal THEN bytes=read
total
2080 !readcount=bytes
2090 !readto=data
2100 PROCdiscio("R")
2110 readtotal=readtotal-bytes
2120 PROCramio(store)
2130 srend=(srsize=srbase)
2140 UNTIL readtotal<1 OR srend
2150 CLOSE# ?readhandle
2160 PRINT "Closed ";name$(in):
2170 IF readtotal<1 THEN fileno=fileno+
1 :?readhandle=0
2180 ENDPROC
2190 :
2200 DEF PROCnewinput
2210 !readpointer=0
2220 readtotal=size%(fileno)
2230 ENDPROC
2240 :
2250 DEF PROCramio(type)
2260 IF bufferonly THEN ENDPROC
2270 ?block=type
2280 !(block+1)=data
2290 !(block+5)=bytes+1
2300 ?(block+7)=0
2310 !(block+8)=srbase+srstart
2320 A%=66
2330 X%=block MOD 256
2340 Y%=block DIV 256
2350 CALL osword
2360 srbase=srbase+bytes
2370 ENDPROC
2380 :
2390 DEF PROCoutput
2400 fileno=startfile
2410 srbase=0
2420 PROCoutputdrive
2430 REPEAT
2440 PROCoutputname
2450 bytes=size%(fileno)
2460 srend=(srsize-srbase<bytes) AND (b
ytes<=buffersize)
2470 IF srend THEN GOTO 2490
2480 IF bytes>buffersize THEN PROCwrite
big ELSE PROCwritesmall
2490 UNTIL srend OR fileno>filetot
2500 startfile=fileno
2510 ENDPROC
2520 :
2530 DEF PROCoutputdrive
```

Continued ▶

◄ **Copyfiles (listing 1) continued**

```
2540 IF system$(out)="DISC" THEN OSCLI(
"DRIVE "+drive$(out))
2550 IF system$(out)="DISC" THEN *DIR $
2560 IF system$(out)="ADFS" THEN *ADFS
2570 IF system$(out)="ADFS" THEN OSCLI(
"MOUNT "+drive$(out))
2580 IF system$(out)="ADFS" THEN PROCou
tputdir
2590 ENDPROC
2600 :
2610 DEF PROCoutputdir
2620 IF fileno=1 AND ?writehandle=0 THE
N PROCfetchdir
2630 OSCLI("dir "+outputdir$)
2640 PRINT "Set directory to - ";output
dir$
2650 ENDPROC
2660 :
2670 DEF PROCoutputname
2680 work$=dir$(fileno)+link$+file$(fil
eno)
2690 IF dir$(fileno)="$" THEN work$=MID
$(work$,3)
2700 name$(out)=work$
2710 ENDPROC
2720 :
2730 DEF PROCwritesmall
2740 PROCramio(restore)
2750 PRINT "Writing ";name$(out)
2760 OSCLI "SAVE "+name$(out)+" "+STR$~
data+"+"+STR$~size%(fileno)
2770 PROCattributes
2780 ENDPROC
2790 :
2800 DEF PROCwritebig
2810 IF ?writehandle=0 THEN PROCnewoutp
ut ELSE ?writehandle=OPENUP(name$(out))
2820 PRINT "Opened output ";name$(out)
2830 REPEAT
2840 !writefrom=data
2850 bytes=srsize-srbase
2860 IF bufferonly OR (bytes>buffersize
) THEN bytes=buffersize
2870 IF bytes>writetotal THEN bytes=wri
tetotal
2880 !writecount=bytes
2890 PROCramio(restore)
2900 PROCdiscio("W")
2910 writetotal=writetotal-bytes
2920 srend=(srsize=srbase)
2930 UNTIL writetotal<1 OR srend
2940 CLOSE# ?writehandle
2950 PRINT "Closed ";name$(out)
2960 IF writetotal<1 THEN PROCattribute
s
2970 ENDPROC
2980 :
2990 DEF PROCnewoutput
3000 ?writehandle=OPENOUT(name$(out))
3010 !writepointer=0
3020 writetotal=size%(fileno)
3030 ENDPROC
3040 :
3050 DEF PROCattributes
3060 $osstring=name$(out)
3070 !block=osstring
3080 block!2=load%(fileno)
3090 block!6=exec%(fileno)
3100 block!&A=0
3110 A%=1
3120 X%=block MOD 256
3130 Y%=block DIV 256
3140 CALL osfile
```

Continued ►

◄ **Copyfiles (listing 1) continued**

```
3150 REM load & execute addresses
3160 IF system$(out)="ADFS" THEN block!
&E=3 :REM W & R access
3170 IF system$(out)="DISC" THEN block!
&E=0 :REM Not locked
3180 A%=4
3190 CALL osfile
3200 fileno=fileno+1
3210 ?writehandle=0
3220 ENDPROC
3230 :
3240 DEF PROCfetchdir
3250 REPEAT
3260 CLS
3270 *CAT
3280 PRINT ''"Please enter the ADFS dir
ectory name"
3290 PRINT "that this disc will be tran
sferred to."
3300 PRINT "(Use 'name' or '$.name' or
'$' alone.)"
3310 *FX15
3320 INPUT " "outputdir$
3330 $osstring=outputdir$
3340 !block=osstring
3350 block!2=0
3360 block!6=0
3370 block!10=0
3380 block?14=0
3390 CALL direnquiry
3400 D%=?&70
3410 IF D%=0 THEN OSCLI("CDIR "+outputd
ir$)
3420 IF D%=1 THEN PROCreturn("This name
already present (as a file), ")
3430 UNTIL D%<>1
3440 ENDPROC
3450 :
3460 DEF PROCdiscio(iotype$)
3470 IF iotype$="W" THEN A%=1 ELSE A%=3
3480 IF iotype$="W" THEN X%=writehandle
ELSE X%=readhandle
3490 Y%=X% DIV 256
3500 CALL osgbpb
3510 ENDPROC
3520 :
3530 DEF PROCsectors
3540 *DISC
3550 block?0=EVAL(drive$(in) )
3560 block!1=data
3570 block?5=3
3580 block?6=&53
3590 block?7=0
3600 block?8=0
3610 block?9=&22
3620 block?10=0
3630 X%=block MOD 256
3640 Y%=block DIV 256
3650 A%=&7F
3660 CALL osword
3670 IF block?10>0 THEN PRINT ''''"Disc
error ";block?10 :STOP
3680 filetot=?(data+&105) DIV8
3690 IF filetot=0 THEN PRINT ''''"Empty
disc" :STOP
3700 ENDPROC
3710 :
3720 DEF PROCreturn(out$)
3730 PRINT out$
3740 PRINT "press <Return> to continue.
"
3750 *FX15
3760 REPEAT UNTIL GET=13
```

Continued ►

SYMBOLS/BUSINESS

See Look Before You Layout, page 151

◀ Copyfiles (listing 1) continued

```
3770 ENDPROC
3780 :
3790 DEF PROCmccode
3800 FOR pass=0 TO 2 STEP 2
3810 P%=ioblocks
3820 [OPT pass
3830 .readhandle BRK
3840 .readto BRK:BRK:BRK:BRK
3850 .readcount BRK:BRK:BRK:BRK
3860 .readpointer BRK:BRK:BRK:BRK
3870 .writehandle BRK
3880 .writefrom BRK:BRK:BRK:BRK
3890 .writecount BRK:BRK:BRK:BRK
3900 .writepointer BRK:BRK:BRK:BRK
3910 :
3920 .direnquiry
3930 LDA #5
3940 LDX #block MOD 256
3950 LDY #block DIV 256
3960 JSR osfile
3970 STA &70
3980 RTS
3990 ]
4000 NEXT
4010 ENDPROC
```

See Computerised Hieroglyphics, page 105

Listing 1. *Wordwise +* segment program

```
  REM Wordwise Plus segment program
  REM by Brett Laniosh
  REM for BBC/B+/M/C
  REM (c) Acorn User July 1987
  REM
  CLS
  SELECT TEXT
  PRINT
  PRINT "ALPHA          GAMMA"
  PRINT "LAMBDA         BETA"
  PRINT "OMEGA          DELTA"
  PRINT "PI             MICRO"
  PRINT "ROOT           DIVIDE"
  PRINT "COPYRIGHT      PLUSORMINUS"
  PRINT
  PRINT "ENTER SYMBOL REQUIRED"
  A$=GLK$
  IF A$="ALPHA" THEN TYPE "¦GES75,8,0,12,
18,18,20,14,18,18,0¦W"
  IF A$="GAMMA" THEN TYPE "¦GES75,6,0,0,1
56,98,98,156,0¦W"
  IF A$="LAMBDA" THEN TYPE "¦GES75,9,0,64
,66,36,¦R¦GOC24,8,4,2,2,0¦W"
  IF A$="BETA" THEN TYPE "¦GES75,8,0,0,1,
127,84,¦R¦GOC84,84,40,0¦W"
  IF A$="OMEGA" THEN TYPE "¦GES75,9,0,0,2
,50,78,¦R¦GOC64,78,50,2,0¦W"
  IF A$="DELTA" THEN TYPE "¦GES75,11,0,0,
6,10,18,¦R¦GOC34,66,34,18,10,6,0¦W"
  IF A$="PI" THEN TYPE "¦GES75,8,0,0,32,6
2,32,32,62,34,0¦W"
  IF A$="MICRO" THEN TYPE "¦GES75,5,0,127
,4,4,120,0¦W"
  IF A$="ROOT" THEN TYPE "¦GES75,9,0,24,1
2,6,254¦R¦GOC128,128,128,128,0¦W"
  IF A$="DIVIDE" THEN TYPE "¦GES75,7,0,7,
8,8,42,8,8,0¦W"
  IF A$="COPYRIGHT" THEN TYPE "¦GES75,8,0
,126,129,189¦R¦GOC165,165,165,129,126¦W"
  IF A$="PLUSORMINUS" THEN TYPE "¦GES75,5
,0,34,34,250,34,34¦W"
  DISPLAY
```

Listing 1. Page preview program

```
 10 REM View PAGE driver source
 20 REM by Graham Bell
 30 REM for B/B+/M/C/E & View family
 40 REM (C) Acorn User July 1987
 50 :
 60 gxr = FALSE
 70 lines = 70
 80 chars = 82
 90 name$ = "V.PAGE"
100 :
110 DIM store &FF
120 FOR I% = 0 TO &FF
130 I%?store = 0
140 NEXT
150 osbyte = &FFF4
160 oswrch = &FFEE
170 osrdch = &FFE0
180 origin = &400
190 offset = store - origin
200 :
210 FOR pass = 0 TO 3 STEP 3
220 P% = store
230 [
240 OPT pass
250 JMP output-offset
260 JMP newpage-offset
270 RTS
280 BRK
290 BRK
300 RTS
310 .char BRK
320 .line BRK
330 RTS
340 :
350 .error
360 BRK
370 OPT FNequb(128)
380 OPT FNequs("Bad mode")
390 BRK
400 :
410 .waitforpage
420 LDX #4
430 JSR text-offset
440 JSR osrdch
450 .newpage
460 LDA #135
470 JSR osbyte
480 CPY #2
490 BCC modeok
500 CPY #4
510 BCC error
520 CPY #6
530 BCS error
540 .modeok
550 LDX #0
560 STX line-offset
570 .newline
580 JSR text-offset
590 STX count-offset
600 STX count+1-offset
610 RTS
620 :
630 .text
640 LDY data-offset,X
650 LDA data+1-offset,X
660 SEC
670 SBC data-offset,X
680 TAX
690 .loop
700 LDA data-offset,Y
710 JSR oswrch
720 INY
730 DEX
740 BNE loop
```

Continued ▶

◀ Page preview (listing 1) continued

```
 750 RTS
 760 :
 770 .output
 780 STA char-offset
 790 TXA
 800 PHA
 810 TYA
 820 PHA
 830 LDA line-offset
 840 CMP #lines
 850 BCC notnewpage
 860 JSR waitforpage-offset
 870 .notnewpage
 880 LDA char-offset
 890 BMI return
 900 LDX #1
 910 CMP #13
 920 BNE noteoln
 930 JSR newline-offset
 940 INC line-offset
 950 JMP return-offset
 960 .noteoln
 970 INX
 980 CMP #32
 990 BNE print
1000 INX
1010 .print
1020 JSR text-offset
1030 SEC
1040 LDA count-offset
1050 SBC #8
1060 STA count-offset
1070 BCS return
1080 DEC count+1-offset
1090 .return
1100 PLA
1110 TAY
1120 PLA
1130 TAX
1140 LDA char-offset
1150 RTS
1160 :
1170 .data
1180 OPT FNequb(string0-data)
1190 OPT FNequb(string1-data)
1200 OPT FNequb(string2-data)
1210 OPT FNequb(string3-data)
1220 OPT FNequb(string4-data)
1230 OPT FNequb(stringend-data)
1240 .string0
1250 OPT FNvdu(26)
1260 OPT FNvdu(FNcls(gxr))
1270 OPT FNorig(640-chars*4,496-lines*6
)
1280 OPT FNplot(4,0,0)
1290 OPT FNpage(gxr)
1300 OPT FNplot(4,0,lines*12-5)
1310 .string1
1320 OPT FNplot(0,0,-12)
1330 .string2
1340 OPT FNdot(gxr)
1350 .string3
1360 OPT FNplot(0,8,0)
1370 .string4
1380 OPT FNequs("Next page..")
1390 .stringend
1400 BRK
1410 ]
1420 count = string1 + 2
1430 NEXT pass
1440 :
1450 sum = 0
1460 FOR I% = 0 TO &FF
```

Continued ▶

◀ Page preview (listing 1) continued

```
1470 sum = sum + I%?store
1480 NEXT
1490 IF (sum <> FNtotal(gxr)) AND (line
s = 70) AND (chars = 82) THEN PRINT "che
cksum error - please check listing": END
1500 PROCoscli("SAVE " + name$ + " " +
STR$~store + " +100 40C 400")
1510 END
1520 :
1530 DEF FNdot(graphic)
1540 IF graphic THEN GOTO 1620
1550 [
1560 OPT pass
1570 OPT FNplot(2,7,0)
1580 OPT FNplot(0,-7,-7)
1590 OPT FNplot(2,7,0)
1600 OPT FNplot(0,1,7)
1610 ] = pass
1620 [
1630 OPT pass
1640 OPT FNplot(98,7,-7)
1650 OPT FNplot(0,1,7)
1660 ] = pass
1670 :
1680 DEF FNpage(graphic)
1690 IF graphic THEN GOTO 1760
1700 [
1710 OPT pass
1720 OPT FNplot(4,chars*8-1,0)
1730 OPT FNplot(85,0,lines*12-1)
1740 OPT FNplot(85,chars*8-1,lines*12-1
)
1750 ] = pass
1760 [
1770 OPT pass
1780 OPT FNplot(102,chars*8-1,lines*12-
1)
1790 ] = pass
1800 :
1810 DEF FNtotal(graphic)
1820 IF graphic THEN = &4681 ELSE = &4A
49
1830 :
1840 DEF FNcls(graphic%)
1850 IF graphic% THEN = 12 ELSE = 16
1860 :
1870 DEF FNvdu(code)
1880 = FNequb(code)
1890 :
1900 DEF FNorig(x, y)
1910 pass = FNequb(29)
1920 pass = FNequw(x AND &FFFF)
1930 = FNequw(y AND &FFFF)
1940 :
1950 DEF FNplot(code, x, y)
1960 pass = FNequb(25)
1970 pass = FNequb(code)
1980 pass = FNequw(x AND &FFFF)
1990 = FNequw(y AND &FFFF)
2000 :
2010 DEF FNequb(byte)
2020 ?P% = byte
2030 P% = P% + 1
2040 = pass
2050 :
2060 DEF FNequw(word)
2070 ?P% = word MOD 256
2080 P%?1 = word DIV 256
2090 P% = P% + 2
2100 = pass
2110 :
2120 DEF FNequs(string$)
2130 $P% = string$
```

Continued ▶

◀ Page preview (listing 1) continued

```
2140 P% = P% + LEN string$
2150 = pass
2160 :
2170 DEF PROCoscli(string$)
2180 LOCAL X%, Y%
2190 DIM X% &FF
2200 Y% = X% DIV 256
2210 $X% = string$
2220 CALL &FFF7
2230 ENDPROC
```

See The Network Page, page 160

Listing 1. TSENDA

```
  10 REM TSENDA (Acorn ROM Teletext)
  20 REM By Robin Newman
  30 REM For BBC B/B+/M + Econet
  40 REM With Acorn Txt Adaptor
  50 REM (c) Acorn User July 1987
  60 :
  70 MODE 7
  80 DIM os% 10,txcb%11,date%60,store%7
  90 ON ERROR PROCerror:END
 100 osword=&FFF1:osbyte=&FFF4
 110 retrymax%=20:tt%=FALSE
 120 PROCintro
 130 ON ERROR GOTO 170
 140 *TTXON
 150 PROCwrongrom
 160 END
 170 ONERROR PROCerror:END
 180 *TELESOFT
 190 tt%=TRUE
 200 REPEAT
 210 VDU 28,0,24,39,7,12,26
 220 retry%=0
 230 REPEAT
 240 PRINT TAB(0,7);:*DATE
 250 PROCstore
 260 retry%=retry%+1
 270 UNTIL FNvalidate OR retry%>retryma
x%
 280 IF retry%>retrymax% PROCnodate:END
 290 PROCte
 300 daycheck=date%?17:newday=FALSE
 310 VDU 28,0,24,39,8
 320 REPEAT
 330 PROCsend:PRINT ".";
 340 UNTIL newday=TRUE
 350 UNTIL FALSE
 360 :
 370 DEF PROCsend
 380 LOCAL N%
 390 txcb%!4=!store%:txcb%!8=store%!4
 400 PROCtx(&21)
 410 FOR N%=4 TO 11
 420 txcb%?N%=(N%?(date%+20))AND&7F
 430 NEXT
 440 txcb%?9=58
 450 IF daycheck<>date%?17 newday=TRUE:
ENDPROC
 460 PROCtx(&20)
 470 ENDPROC
 480 :
 490 DEF PROCte
 500 LOCAL X%,Y%,A%
 510 A%=&7A:X%=os%:Y%=os% DIV 256
 520 ?os%=&92:os%!1=date%
 530 CALL osword
 540 ENDPROC
```

Continued ▶

◀ Network Page listing 1 continued

```
 550 :
 560 DEF PROCstore
 570 LOCAL N%
 580 RESTORE:FOR N%=0 TO 7:READ d%
 590 store%?N%=FNread(&7C00+d%+280)
 600 NEXT
 610 ENDPROC
 620 :
 630 DEF PROCtx(P%)
 640 LOCAL A%,X%,Y%
 650 X%=txcb%:Y%=txcb% DIV 256:A%=&10
 660 !txcb%=&FFFF2080:txcb%?1=P%
 670 CALL osword
 680 ENDPROC
 690 :
 700 DEF FNread(ad%)
 710 LOCAL A%,X%,Y%
 720 A%=5:X%=os%:Y%=os% DIV 256
 730 !os%=ad%:CALL osword
 740 =os%?4
 750 :
 760 DEF PROCintro
 770 PROCdp("Acorn User Network Time Su
ite",131,3,1)
 780 PROCdp("Teletext Adaptor time tran
smit program",131,0,4)
 790 REPEAT:UNTIL GET=32
 800 VDU 23,1,0;0;0;0;
 810 ENDPROC
 820 :
 830 DEF PROCdp(A$,c%,x%,y%)
 840 PRINTTAB(x%,y%)CHR$c%;CHR$141;A$
 850 PRINTTAB(x%,y%+1)CHR$c%;CHR$141;A$
 860 ENDPROC
 870 :
 880 DEF PROCerror
 890 ON ERROR OFF
 900 VDU 26,12,23,1,1;0;0;0;
 910 IF ERL=190 PRINT"Acorn Teletext RO
M not active":END
 920 IF ERR<>17 REPORT:PRINT" at line "
;ERL:ENDPROC
 930 IF tt% THEN *HOFF
 940 PRINT"Program ended"
 950 ENDPROC
 960 :
 970 DEF FNvalidate
 980 LOCAL N%,flag%
 990 flag%=TRUE:FOR N%=0 TO 7
1000 IFstore%?N%>57 THEN flag%=FALSE
1010 NEXT
1020 =flag%
1030 :
1040 DEF PROCnodate
1050 VDU 26,12
1060 PRINT TAB(0,2)"A valid date is not
 obtainable."
1070 PRINT"Check the Teletext Adaptor t
uning."
1080 VDU 23,1,1;0;0;0;
1090 ENDPROC
1100 :
1110 DEF PROCwrongrom
1120 VDU 26,12
1130 PRINT"You are using the BBC Telete
xt ROM."
1140 PRINT"Use the program TSENDB"
1150 VDU 23,1,1;0;0;0;
1160 ENDPROC
1170 :
1180 DATA 0,1,3,4,6,7,8,9
```

Listing 2. TSENDB

```
   10 REM TSENDB (BBC ROM Teletext)
   20 REM By Robin Newman
   30 REM For BBC B/B+/M + Econet
   40 REM With Txt Adaptor + ATS
   50 REM (c) Acorn User July 1987
   60 :
   70 DIM T% 20,te% 30
   80 tt%=FALSE
   90 MODE 7
  100 ON ERROR PROCerror:END
  110 osword=&FFF1
  120 PROCintro
  130 *TELESOFT
  140 ON ERROR PROCwrongrom:END
  150 *TTXON
  160 ON ERROR PROCerror:END
  170 tt%=TRUE
  180 REPEAT
  190 PROCtcall(21)
  200 T%!4=te%!1
  210 T%!8=te%!5
  220 PROCsend(&20)
  230 PROCtcall(22)
  240 T%!4=te%!1
  250 T%!6=te%!4
  260 T%!8=te%!7
  270 PROCsend(&21)
  280 PRINT".";
  290 TIME=0
  300 REPEAT UNTIL TIME>30
  310 UNTIL FALSE
  320 :
  330 DEF PROCtcall(P%)
  340 ?te%=P%
  350 X%=te% MOD 256
  360 Y%=te% DIV 256
  370 A%=&7A
  380 CALL osword
  390 ENDPROC
  400 :
  410 DEF PROCsend(P%)
  420 !T%=&FFFF2080
  430 T%?1=P%
  440 X%=T% MOD 256
  450 Y%=T% DIV 256
  460 A%=&10
  470 CALL osword
  480 ENDPROC
  490 :
  500 DEF PROCerror
  510 ON ERROR OFF
  520 VDU 26
  530 CLS
  540 VDU 23,1,1;0;0;0;
  550 IF ERL=120 PRINT"ATS ROM not activ
e":ENDPROC
  560 IF ERR<>17 REPORT:PRINT" at line "
;ERL:ENDPROC
  570 IF tt% THEN *TTXOFF
  580 PRINT"Program ended"
  590 ENDPROC
  600 :
  610 DEF PROCintro
  620 PROCdp("Acorn User Network Time Su
ite",131,3,1)
  630 PROCdp("Teletext Adaptor time tran
smit program",131,0,4)
  640 PRINT'"Push SPACEBAR to continue"
  650 PRINT'"or ESCAPE to STOP ";
  660 REPEAT UNTIL GET=32
  670 VDU 28,0,24,39,7
  680 CLS
  690 VDU 23,1,0;0;0;0;
```

Continued ▶

◀ Network Page listing 2 continued

```
  700 ENDPROC
  710 :
  720 DEF PROCdp(A$,C%,X%,Y%)
  730 PRINT TAB(X%,Y%) CHR$C%;CHR$141;A$
  740 PRINT TAB(X%,Y%+1) CHR$C%;CHR$141;
A$
  750 ENDPROC
  760 :
  770 DEF PROCwrongrom
  780 VDU 26,12
  790 VDU 23,1,1;0;0;0;
  800 PRINT TAB(0,2)"You are using the A
corn Teletext ROM."
  810 PRINT"Use the program TSENDA"
  820 ENDPROC
```

Listing 3. TTTOM

```
   10 REM TTTOM (Txt sets Master Clock)
   20 REM By Robin Newman
   30 REM For BBC M,(C,B,B+) with Econet
   40 REM (c) Acorn User July 1987
   50 :
   60 MODE 7
   70 ON ERROR PROCerror:END
   80 osword=&FFF1
   90 osbyte=&FFF4
  100 retrymaxrx%=1000
  110 PROCintro
  120 PRINT TAB(0,2)"Please wait..."
  130 DIM rxcb%12,rbuf%&100
  140 PROCrxb
  150 PROCread(&20,0,rbuf%,rbuf%+8)
  160 PROCread(&21,0,rbuf%+9,rbuf%+18)
  170 rbuf%?8=13
  180 rbuf%?17=13
  190 time$=$rbuf%
  200 date$=$(rbuf%+9)
  210 d$=MID$(date$,1,2)
  220 d%=VALd$
  230 m%=VAL(MID$(date$,3,2))
  240 RESTORE 1330
  250 FOR Z%=1 TO m%
  260 READ m$
  270 NEXT
  280 y$=RIGHT$(date$,4)
  290 y%=VAL(y$)
  300 TIME$=FNday(d%,m%,y%)+","+d$+" "+m
$+" "+y$+"."+time$
  310 PRINT TAB(0,2)TIME$
  320 PRINT "Program finished."
  330 END
  340 :
  350 DEF PROCosw(A%,buf%)
  360 LOCAL X%,Y%
  370 X%=buf%
  380 Y%=buf% DIV 256
  390 CALL osword
  400 ENDPROC
  410 :
  420 DEF PROCosb(A%,X%,Y%)
  430 CALL osbyte
  440 ENDPROC
  450 :
  460 DEF FNosb(A%,X%,Y%)
  470 =(USR(osbyte)AND &FFFF00)DIV 256
  480 :
  490 DEF FNrxcb(port,station,buffer,ble
ngth,rbn)
```

Continued ▶

◀ Network Page listing 3 continued

```
 500 ?rxcb%=rbn
 510 rxcb%?1=&7F
 520 rxcb%?2=port
 530 rxcb%?3=station
 540 rxcb%?4=0
 550 rxcb%!5=buffer
 560 rxcb%!9=buffer+blength
 570 PROCosw(&11,rxcb%)
 580 =?rxcb%
 590 :
 600 DEF PROCread(port,station,buffer,b
length)
 610 LOCAL rn%,poll%
 620 rn%=FNrxcb(port,station,buffer,ble
ngth,0)
 630 IF rn%=0 THEN PRINT "Rx block cann
ot be opened":END
 640 poll%=&7F
 650 retry%=0
 660 REPEAT
 670 retry%=retry%+1
 680 poll%=FNosb(&33,rn%,0) AND &FF
 690 UNTIL poll%<>&7F OR retry%=retryma
xrx%
 700 IF retry%=retrymaxrx% THEN PROCosb
(&34,rn%,0):PRINT "Time out: data not re
ceived":END
 710 IF FNrxcb(port,station,buffer,blen
gth,rn%)=0 THEN PRINT "Invalid receive b
lock number":END
 720 PROCnfs334
 730 ENDPROC
 740 :
 750 DEF FNday(d%,m%,y%)
 760 LOCAL d$,Z%,N%
 770 RESTORE 1340
 780 IF m%<3 m%=m%+12:y%=y%-1
 790 N%=d%+2*m%+INT(.6*(m%+1))+y%+y% DI
V 4-y% DIV 100+y% DIV 400+2
 800 N%=N% MOD 7
 810 FOR Z%=0 TO N%
 820 READ d$
 830 NEXT
 840 =d$
 850 :
 860 DEF FNstring(t%)
 870 LOCAL t$
 880 t$=STR$ t%
 890 IF t%<10 t$="0"+t$
 900 =t$
 910 :
 920 DEF PROCintro
 930 PROCdp("Acorn User Network Time Su
ite.",131,3,1)
 940 PROCdp("Teletext adaptor sets Mast
er's clock.",131,0,4)
 950 PRINT'"Push SPACEBAR to proceed,"
 960 PRINT'"or ESCAPE to abort ";
 970 REPEAT UNTIL GET=32
 980 CLS
 990 ENDPROC
1000 :
1010 DEF PROCdp(A$,C%,X%,Y%)
1020 PRINT TAB(X%,Y%)CHR$C%;CHR$141;A$
1030 PRINT TAB(X%,Y%+1)CHR$C%;CHR$141;A
$
1040 ENDPROC
1050 :
1060 DEF PROCerror
1070 ON ERROR OFF
1080 IF ERR=4 PROCprinttime:ENDPROC
1090 CLS
```

Continued ▶

◀ Network Page listing 3 continued

```
1110 PROCrxb
1120 IF ERR<>17 REPORT:PRINT" at line "
;ERL
1130 ENDPROC
1140 :
1150 DEF PROCrxb
1160 LOCAL A%,X%
1170 A%=52
1180 FOR X%=0 TO 15
1190 CALL osbyte
1200 NEXT
1210 ENDPROC
1220 :
1230 DEF PROCprinttime
1240 time$=FNday(d%,m%,y%)+","+d$+" "+m
$+" "+y$+"."+time$
1250 PRINT TAB(0,2)time$;STRING$(15," "
)
1260 PRINT '"Program finished"
1270 ENDPROC
1280 :
1290 DEF PROCnfs334
1300 IF rxcb%!5<>buffer !buffer=rxcb%!5
:buffer!4=rxcb%!9
1310 ENDPROC
1320 :
1330 DATA Jan,Feb,Mar,Apr,May,Jun,Jul,A
ug,Sep,Oct,Nov,Dec
1340 DATA Sat,Sun,Mon,Tue,Wed,Thu,Fri
```

Listing 4. FSTOM

```
 10 REM FSTOM (FS sets Master clock)
 20 REM By Robin Newman
 30 REM For BBC B/B+/Master/Compact wi
th Econet
 40 REM (c) Acorn User July 1987
 50 :
 60 MODE 7
 70 dongle=FALSE
 80 DIM b% 80
 90 osword=&FFF1
100 osbyte=&FFF4
110 ON ERROR PROCerror:END
120 PROCintro
130 IF NOT dongle PRINTTAB(0,2)"Please
 wait..."
140 PROCrxb
150 PROCgettime
160 IF dongle mval=min:PROCwait
170 RESTORE 1110
180 FOR Z%=1 TO month
190 READ month$
200 NEXT
210 day$=FNstring(day)
220 date$=FNday(day,month,year)+","+da
y$+" "+month$+" "+STR$year
230 hr$=FNstring(hr)
240 min$=FNstring(min)
250 sec$=FNstring(sec)
260 t$=hr$+":"+min$+":"+sec$
270 TIME$=date$+"."+t$
280 PRINT TAB(0,2)TIME$;STRING$(15," "
)
290 PRINT '"Program finished"
300 END
310 :
```

Continued ▶

◄ Network Page listing 4 continued

```
 320 DEF FNday(d%,m%,y%):LOCAL d$,Z%,N%
 330 RESTORE 1100
 340 IF m%<3 m%=m%+12:y%=y%-1
 350 N%=d%+2*m%+INT(.6*(m%+1))+y%+y% DI
V  4-y% DIV 100+y% DIV 400+2
 360 N%=N% MOD 7
 370 FOR Z%=0 TO N%
 380 READ d$
 390 NEXT
 400 =d$
 410 :
 420 DEF FNstring(t%)
 430 LOCAL t$
 440 t$=STR$(t%)
 450 IF t%<10 t$="0"+t$
 460 =t$
 470 :
 480 DEF PROCwait
 490 PRINT TAB(0,2)"Waiting for next mi
nute change..."
 500 REPEAT
 510 PROCgettime
 520 UNTIL min<>mval
 530 ENDPROC
 540 :
 550 DEF PROCgettime
 560 LOCAL A%,X%,Y%
 570 A%=&14
 580 X%=b% MOD 256
 590 Y%=b% DIV 256
 600 !b%=0
 610 b%?1=8
 620 b%!3=16
 630 CALL osword
 640 IF b%?3<>0 PRINT"Error : ";$(b+4):
END
 650 day=b%?4
 660 year=1981+b%?5 DIV 16
 670 month=b%?5 MOD 16
 680 hr=b%?6
 690 min=b%?7
 700 sec=b%?8
 710 ENDPROC
 720 :
 730 DEFPROCintro
 740 PROCdp("Acorn User Network Time Su
ite.",131,3,1)
 750 PROCdp("Fileserver clock sets Mast
er's clock.",131,0,4)
 760 PRINT '"Push SPACEBAR to proceed,"
 770 PRINT '"or ESCAPE to abort ";
 780 REPEAT UNTIL GET=32
 790 CLS
 800 ENDPROC
 810 :
 820 DEF PROCdp(A$,C%,X%,Y%)
 830 PRINT TAB(X%,Y%)CHR$C%;CHR$141;A$
 840 PRINT TAB(X%,Y%+1)CHR$C%;CHR$141;A
$
 850 ENDPROC
 860
 870 DEF PROCerror
 880 ON ERROR OFF
 890 IF ERR=4 PROCprinttime:ENDPROC
 900 CLS
 910 PRINTTAB(0,2)"Program aborted"'
 920 PROCrxb
 930 IF ERR<>17 REPORT:PRINT" at line "
;ERL
 940 ENDPROC
```

Continued ►

◄ Network Page listing 4 continued

```
 950 :
 960 DEF PROCrxb
 970 LOCAL A%,X%
 980 A%=52
 990 FOR X%=0 TO 15
1000 CALL osbyte
1010 NEXT
1020 ENDPROC
1030 :
1040 DEF PROCprinttime
1050 time$=date$+"."+t$
1060 PRINT TAB(0,2)time$;STRING$(15," "
)
1070 PRINT '"Program finished"
1080 ENDPROC
1090 :
1100 DATA Sat,Sun,Mon,Tue,Wed,Thu,Fri
1110 DATA Jan,Feb,Mar,Apr,May,Jun,Jul,A
ug,Sep,Oct,Nov,Dec
```

Listing 5. MTOFS

```
  10 REM MTOFS (MASTER sets FS clock)
  20 REM By Robin Newman
  30 REM For Master with Econet
  40 REM (c) Acorn User July 1987
  50 :
  60 MODE 7
  70 DIM block% 80,clock% 7
  80 dongle=FALSE
  90 osword=&FFF1
 100 osbyte=&FFF4
 110 ON ERROR PROCerror:END
 120 PROCintro
 130 PROCcheck
 140 IF NOT dongle PRINTTAB(0,2)"Please
wait..."
 150 PROCclock
 160 IF dongle mval%=X%?5:PROCwait
 170 year=FNbcd(?X%)
 180 month=FNbcd(X%?1)
 190 day=FNbcd(X%?2)
 200 hrs=FNbcd(X%?4)
 210 mins=FNbcd(X%?5)
 220 secs=FNbcd(X%?6)
 230 PROCfsclockset
 240 PRINT TAB(0,2)"Fileserver clock se
t"STRING$(15," ")
 250 PRINT TIME$
 260 END
 270 :
 280 DEF PROCwait
 290 PRINT TAB(0,2)"Waiting for next mi
nute change..."
 300 REPEAT
 310 PROCclock
 320 UNTIL X%?5<>mval%
 330 ENDPROC
 340 :
 350 DEF PROCclock
 360 A%=&E:X%=clock%:Y%=X% DIV 256
 370 ?X%=1:CALL osword
 380 ENDPROC
 390 :
 400 DEF FNbcd(X%)
 410 =10*(X%DIV16)+X%MOD16
 420 :
 430 DEF PROCfsclockset
```

Continued ►

◀ Network Page listing 5 continued

```
440 block%!0=&1C000C00
450 block%!4=0
460 block%?7=day
470 block%?8=(year-81)*16+month
480 block%?9=hrs
490 block%?10=mins
500 block%?11=secs
510 X%=block%:Y%=X% DIV 256
520 A%=&14:CALL osword
530 IF block%?3=0 ENDPROC
540 PRINT "Error : "$(block%+4)
550 END
560 :
570 DEF PROCintro
580 PROCdp("Acorn User Network Time Su
ite.",131,3,1)
590 PROCdp("Master's clock sets Filese
rver clock.",131,0,4)
600 PRINT '"Push SPACEBAR to proceed,"
610 PRINT '"or ESCAPE to abort ";
620 REPEAT:UNTIL GET=32
630 CLS
640 ENDPROC
650 :
660 DEF PROCdp(A$,c%,x%,y%)
670 PRINTTAB(x%,y%)CHR$c%;CHR$141;A$
680 PRINTTAB(x%,y%+1)CHR$c%;CHR$141;A$
690 ENDPROC
700 :
710 DEF PROCerror
720 ON ERROR OFF
730 CLS
740 PRINTTAB(0,2)"Program aborted"'
750 PROCrxb
760 IF ERR<>17 REPORT:PRINT" at line "
;ERL
770 ENDPROC
780 :
790 DEF PROCrxb
800 LOCAL A%,X%
810 A%=52:FOR X%=0 TO 15
820 CALL osbyte:NEXT
830 ENDPROC
840 :
850 DEF PROCcheck
860 LOCAL A%,X%,Y%
870 A%=0:X%=1
880 Y%=(USR(osbyte)AND&FF00)/&100
890 IF Y%=3 OR Y%=4 ENDPROC
900 CLS
910 PRINT TAB(0,2)"This is not a MASTE
R computer."
920 PRINT '"It will not run this progr
am correctly."
930 END
```

Listing 6. TTTOFS

```
10 REM TTTOFS (Txt sets FS clock)
20 REM By Robin Newman
30 REM For BBC B/B+/M/C with Econet
40 REM (c) Acorn User July 1987
50 :
60 MODE 7
70 DIM rxcb%12,rbuf%&100,block%80
80 osword=&FFF1
90 osbyte=&FFF4
100 dongle=FALSE
110 retrymaxrx%=1000
120 ON ERROR PROCerror:END
```

Continued ▶

◀ Network Page listing 6 continued

```
130 PROCintro
140 PROCrxb
150 PROCread(&20,0000,rbuf%,rbuf%+8)
160 IF dongle mval%=rbuf%?4:PROCwait
170 PROCread(&21,0000,rbuf%+9,rbuf%+18
)
180 rbuf%?8=13:rbuf%?17=13
190 time$=$rbuf%:date$=$(rbuf%+9)
200 d$=MID$(date$,1,2)
210 dat=VALd$
220 mon=VAL(MID$(date$,3,2))
230 RESTORE 1420
240 FOR Z%=1 TO mon:READ m$:NEXT
250 y$=RIGHT$(date$,4)
260 year=VAL(y$)
270 hrs=VAL(LEFT$(time$,2))
280 mins=VAL(MID$(time$,4,2))
290 secs=VAL(RIGHT$(time$,2))
300 PROCfsclockset
310 PRINT TAB(0,2)"Fileserver clock se
t."STRING$(15," ")
320 PRINT FNday(dat,mon,year)", "d$" "m
$" "y$"."time$
330 END
340 :
350 DEF PROCosw(A%,buf%)
360 LOCAL X%,Y%
370 X%=buf%:Y%=buf% DIV256
380 CALLosword
390 ENDPROC
400 :
410 DEF PROCosb(A%,X%,Y%)
420 CALL osbyte
430 ENDPROC
440 :
450 DEF FNosb(A%,X%,Y%)
460 =(USR(osbyte)AND&FFFF00)DIV256
470 :
480 DEF FNrxcb(port,station,buffer,ble
ngth,rbn)
490 ?rxcb%=rbn
500 rxcb%?1=&7F
510 rxcb%?2=port
520 rxcb%?3=station
530 rxcb%?4=0
540 rxcb%!5=buffer
550 rxcb%!9=buffer+blength
560 PROCosw(&11,rxcb%)
570 =?rxcb%
580 :
590 DEF PROCread(port,station,buffer,b
length)
600 LOCAL rn%,poll%
610 rn%=FNrxcb(port,station,buffer,ble
ngth,0)
620 IF rn%=0 THEN PRINT"Rx block canno
t be opened":END
630 poll%=&7F:retry%=0
640 REPEAT
650 retry%=retry%+1
660 poll%=FNosb(&33,rn%,0)AND&FF
670 UNTIL poll%<>&7F OR retry%=retryma
xrx%
680 IF retry%=retrymaxrx% THEN PROCosb
(&34,rn%,0):PRINT"Time out: data not rec
eived":END
690 IF FNrxcb(port,station,buffer,blen
gth,rn%)=0 THEN PRINT"Invalid receive bl
ock number":END
700 PROCnfs334
710 ENDPROC
```

Continued ▶

◀ Network Page listing 6 continued

```
   720 :
   730 DEF PROCwait
   740 PRINT TAB(0,2)"Waiting for next mi
nute change..."
   750 REPEAT
   760 PROCread(&20,0000,rbuf%,rbuf%+8)
   770 UNTIL rbuf%?4<>mval%
   780 ENDPROC
   790 :
   800 DEF FNday(dat,mon,year)
   810 LOCAL d$,Z%,N%
   820 RESTORE 1410
   830 IF mon<3 mon=mon+12:year=year-1
   840 N%=dat+2*mon+INT(.6*(mon+1))+year+
year DIV 4-year DIV 100+year DIV 400+2
   850 N%=N% MOD 7
   860 FOR Z%=0 TO N%:READ d$:NEXT
   870 =d$
   880 :
   890 DEF FNstring(t%)
   900 LOCAL t$
   910 t$=STR$t%
   920 IF t%<10 t$="0"+t$
   930 =t$
   940 :
   950 DEF PROCfsclockset
   960 block%!0=&1C000C00
   970 block%!4=0
   980 block%?7=d
   990 block%?8=(year-1981)*16+mon
  1000 block%?9=hrs
  1010 block%?10=mins
  1020 block%?11=secs
  1030 X%=block%:Y%=X% DIV 256
  1040 A%=&14:CALL osword
  1050 IF block%?3=0 THEN ENDPROC
  1060 PRINT "Error : "$(block%+4)
  1070 END
  1080 :
  1090 DEF PROCintro
  1100 PROCdp("Acorn User Network Time Su
ite.",131,3,1)
  1110 PROCdp("Teletext adaptor sets File
server clock",131,0,4)
  1120 PRINT'"Push SPACEBAR to proceed,"
  1130 PRINT'"or ESCAPE to abort ";
  1140 REPEAT:UNTIL GET=32
  1150 CLS
  1160 ENDPROC
  1170 :
  1180 DEF PROCdp(A$,c%,x%,y%)
  1190 PRINTTAB(x%,y%)CHR$c%;CHR$141;A$
  1200 PRINTTAB(x%,y%+1)CHR$c%;CHR$141;A$
  1210 ENDPROC
  1220 :
  1230 DEF PROCerror
  1240 ON ERROR OFF
  1250 CLS
  1260 PRINTTAB(0,2)"Program aborted"'
  1270 PROCrxb
  1280 IF ERR<>17 REPORT:PRINT" at line "
;ERL
  1290 ENDPROC
  1300 :
  1310 DEF PROCrxb
  1320 LOCAL A%,X%
  1330 A%=52:FOR X%=0 TO 15
  1340 CALL osbyte:NEXT
  1350 ENDPROC
  1360 :
  1370 DEF PROCnfs334
  1380 IF rxcb%!5<>buffer !buffer=rxcb%!5
:buffer!4=rxcb%!9
  1390 ENDPROC
```

Continued ▶

◀ Network Page listing 6 continued

```
  1400 :
  1410 DATA Sat,Sun,Mon,Tue,Wed,Thu,Fri
  1420 DATA Jan,Feb,Mar,Apr,May,Jun,Jul,A
ug,Sep,Oct,Nov,Dec
```

See Education News, page 161

Listing 1. Front Page amendments

```
Front Page (MAPE Tape II):

LOAD "FRONTP"

   45 DIM OSW 10
  190 TEMP%=A%:X%=OSW MOD256:Y%=OSW DIV
256:A%=&A:?OSW=B%+32:CALL &FFF1:C%=OSW+1
:A%=TEMP%
 1290 CLEAR:A$="":DIM OSW 10

SAVE "FRONTP"


Front Page Extra (MAPE Tape III):

LOAD "CHECK"

 4000 DEFPROCpri:Z=0
 4005 A%=0:X%=255:OS=(USR&FFF4 AND&FFFF)
DIV256:IFOS<3:ELSEA%=182:X%=0:Y%=255:IF(
USR&FFF4 AND&8000):Z=10:ELSEOS=0
 4010 IFOS<3:A%=246:X%=0:Y%=255:IF(USR&F
FF4 AND&FFFF)DIV256<>10:Z=10
 7240 B%=X*8+Y*640+&3000:PROCmem(&72,B%)
:FORA%=1TOLENA$:B%=ASC(MID$(A$,A%,1)):PR
OCrd(B%):PROCmem(&70,&81):?&74=x:?&79=y:
CALLD%:B%=?&72+256*?&73:B%=B%-640*?&79+8
*?&74:PROCmem(&72,B%):NEXT:ENDPROC
 7250 DEFPROCrd(C):LOCALA%,X%,Y%:A%=10:X
%=&80:Y%=0:?X%=C:CALL&FFF1:ENDPROC

SAVE "CHECK"

LOAD "FIRSTP1"

 7240 B%=X*8+Y*640+&3000:PROCme(&72,B%):
FORL=1TOLENA$:B%=ASC(MID$(A$,L,1)):PROCr
d(B%):PROCme(&70,&81):?&74=x:?&79=y:CALL
D%:B%=?&72+256*?&73:B%=B%-640*?&79+8*?&7
4:PROCme(&72,B%):NEXT:ENDPROC
 7250 DEFPROCrd(C):LOCALA%,X%,Y%:A%=10:X
%=&80:Y%=0:?X%=C:CALL&FFF1:ENDPROC

SAVE "FIRSTP1"
```

July listings

The easiest way to enter the listings is to buy the monthly listings' disc or cassette. It saves time and avoids errors.

The disc is fully menu-driven and an excellent buy at only £5.95. The cassette version costs £3.95. See the order form on page 129 for details of how to order.

*Alternatively, if you have a Micronet subscription, you can download the programs from page 600 600 890A. Download just like any other Prestel program – go to the first page entering *600600890, then follow the prompts. The charge for the software is £5.00.*

ACORN USER ORDER FORM

ACORN USER OFFERS

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Yes! Please send me my free disc binder and start my disc subscription from the ____________ issue

01 UK (six months only*)	☐ £30.00
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02 OVERSEAS (Surface)	☐ £76.00
03 OVERSEAS (Airmail)	☐ £84.00

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* Disc binder not included

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Yes! Please start my cassette subscription from the ________ issue and send me my free games cassette

01 UK (six months only*)	☐ £20.00
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03 OVERSEAS (Airmail)	☐ £62.00

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☐ APR 0207-0	☐ NOV 0214-3	☐ APR 0219-4
☐ MAY 0208-9	☐ DEC 0215-1	☐ MAY 0220-8
☐ JUN 0209-7		☐ JUN 0221-6
☐ JUL 0210-0		☐ JUL 0222-4

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All AU discs are in DFS format for the 1770 and 8271 systems. Monthly discs are 5.25-inch (40 track with 80 track transfer program supplied)

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☐ MAR 0411-1	☐ MAR 0423-5	☐ MAR 0435-9
☐ APR 0412-X	☐ APR 0424-3	☐ APR 0436-7
☐ MAY 0413-8	☐ MAY 0425-1	☐ MAY 0437-5
☐ JUN 0414-6	☐ JUN 0426-X	☐ JUN 0438-3
☐ JUL 0415-4	☐ JUL 0427-8	☐ JUL 0439-1
☐ AUG 0416-2	☐ AUG 0428-6	
☐ SEP 0417-0	☐ SEP 0429-4	
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Monthly cassettes are suitable for BBC micro and Electron users

TOTAL VALUE £ ________

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☐ JAN 0021-3	☐ JAN 0032-9	☐ JAN 0044-2
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☐ MAY 0024-8	☐ APR 0035-3	☐ MAY 0048-5
☐ JUN 0025-6	☐ MAY 0036-1	☐ JUN 0049-3
☐ JUL 0026-4	☐ JUN 0037-X	☐ JUL 0050-7
☐ AUG 0027-2	☐ JUL 0038-8	
☐ SEP 0028-0	☐ AUG 0039-6	
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UK = £9.95
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80-track 0809-5 ☐
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BIBLIOGRAPHY
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Jun 84 to May 85 0852-4☐ £6.95
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Jul 82 to Feb 86 0881-8☐ £20
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N Y D P

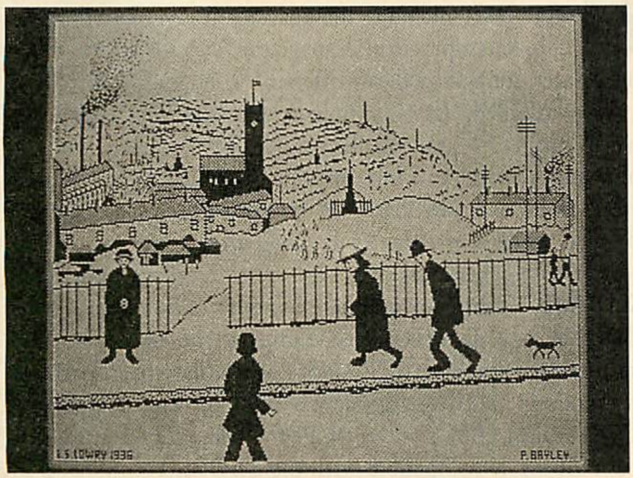
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OFFERS

PROGRAM LISTINGS



Mid-summer madness with the July listings

John Knight's program on this month's disc and cassette is a must for anyone who has swapped their BBC micro for a Master. This simple to use program enables you to transfer all your precious programs from DFS to ADFS, so all those hours spent writing programs for your BBC micro will not be wasted now you have upgraded.

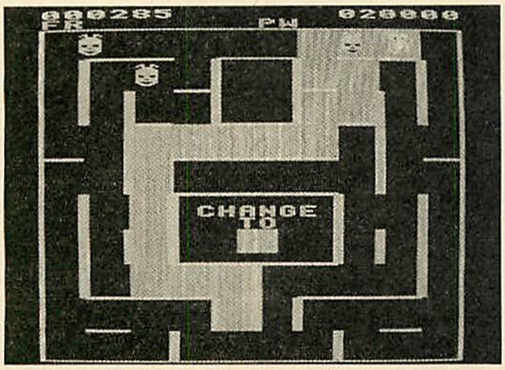
Joe Telford has been playing with the Domesday interactive video discs and the IV machine and his jottings for this month are in both Basic and Logo to help you use the Domesday machine in your own programs.

Graham Bell, our technical editor, has been hard at work producing a page previewer program which is also on this month's disc or cassette. His *Page Driver* draws a picture of a page of text, enabling you to visualise what the finished text will look like. With this program all your future letters and documents can be perfectly produced.

For all network users who are confused or wary of changing the network clock, Robin Newman has the answer. From Tessie Revivis we have included some further examples of translating Basic commands into assembler, this time on using music. Forum has supplied a program for angling text on the screen, whilst this month's Hints & Tips provides a day-of-the-week-utility and a handy *ViewSheet* spreadsheet.

Don't miss the July graphics bonus, a Lowry picture, 'View of a town', as seen by Paul Bayley.

LISTINGS



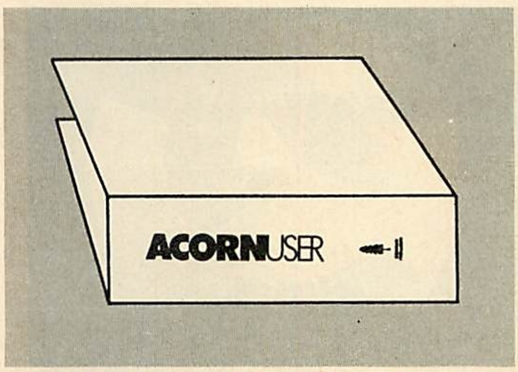
Monthly disc and cassette subscriptions

Guarantee delivery of your monthly program listings by subscribing to our discs or cassettes, for the best quality utilities, graphics and entertainment.

New cassette subscribers receive a free *Games Compendium* cassette, and new monthly disc subscribers qualify for one of our grey cloth disc binders, to hold a year's discs. Or if you prefer, try us out for six months and save yourself money. See page 129 for details.

Whichever you choose you won't regret the investment. All offers are open to UK subscribers only.

BINDERS



Vastly reduced prices for disc binders

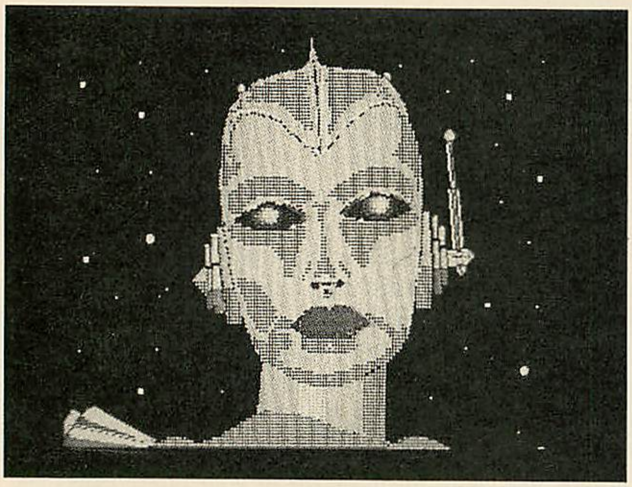
Our grey cloth disc binder is supplied with its own protective slip case and is filled with six transparent inserts, which will hold a year's supply of 5.25-inch monthly discs, and it is currently available at the special price of just £6.95.

An *Acorn User* magazine binder is the best way to keep your precious copies in pristine condition. Our smart red binder features a wide spine with the capacity to hold a whole year's issues. For only £4.95 your magazines can last a lifetime.

Acorn User order form on page 130 – 24 hour telephone service (0672) 40825

OFFERS

D U M P   R O M S



Printer control with the UserDump ROM

BBC/B/B+/M/C/E This pack includes the easy-to-fit *UserDump* ROM chip and a practical 22-page guide to the screen dump and printer control facilities offered – for just £19.95.

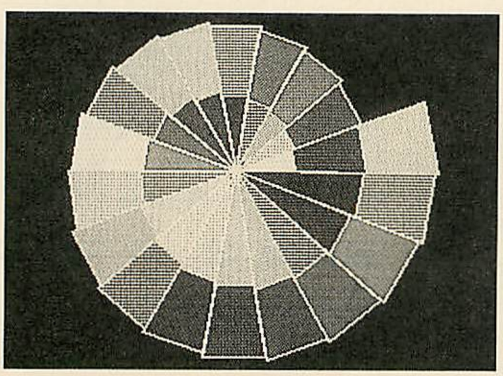
Once installed, *UserDump* will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing in direct from the keyboard. A perfect dump can also be obtained while a machine code program is running.

UserDump features the following extra commands: *WDUMP – dump of graphics window only in any mode; *ZDUMP – a distortion-free dump of the mode 0 screen using plotter graphics; *TRANSIT – translate teletext screen into mode 1; *SHIFT ‹argument› – shift any area of memory; *IBM – select IBM printer; *CP80 – select CP80 printer.

UserDump is compatible with the BBC micro (model B or B+) fitted with operating system 1.2. Any earlier version will cause problems. *UserDump* is fully compatible with the Acorn 6502 second processor. It works with any printer which has single density and double density bit image graphics, including all Epson (LX, RX and FX) printers, Star Gemini and Delta, SG, SD and SR, Canon and Kaga NLQ. Also usable are the Shinwa and other CP80 printers.

There are many more commands available with *UserDump*, and details are available by writing to Seran, Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF.

R O M S

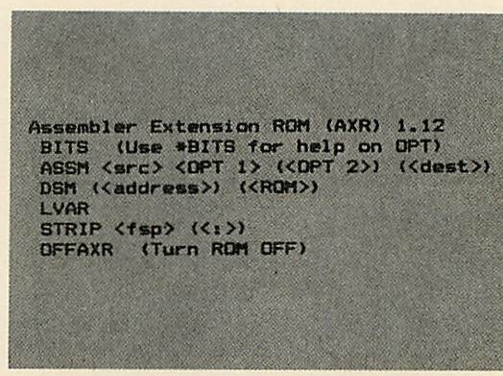


Your favourite Acorn User routines

BBC/B/B+/M/C/E Get *UserROM* for your favourite *Acorn User* routines. Plug in the ROM chip and 19 routines are instantly accessible via star commands, including colfill with 27 colourful fills; dotfill providing 23 new black and white shades; bad program recovery; variable lister; function key lister; a graphics compiler; a circle drawing routine and a sound compiler. There are many demonstration programs and a 22 page manual. All for £19.95.

Full details are available by writing to Seran, Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF.

R O M S



Acorn User Assembler Extension ROM

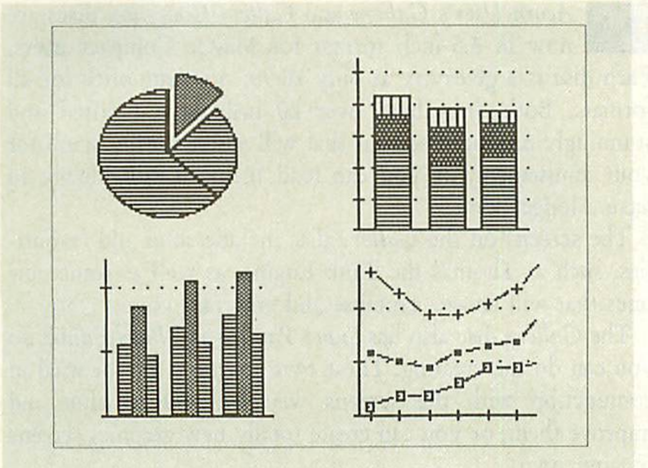
BBC/B/B+/M/C/E The *AXR* ROM, competitively priced at £19.95, is especially designed for use by machine code programmers. *AXR* adds a variety of options and commands to the Basic assembler, along with several new pseudo op codes, full Basic expression evaluation, and even the use of binary numbers. A disassembler is included in the software, and all 65C02 instructions can be used. *AXR* is compatible with Basic 1, 2 and Master.

Further details are available from Seran, Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF.

Acorn User order form on page 130 – 24 hour telephone service (0672) 40825

OFFERS

CHART SOFTWARE



Improve your presentation with ViewChart

BBC/B/B+/M/C Do you use your micro to prepare figures? Perhaps in *ViewSheet* or *ViewStore*? Do you make printed reports? This business graphics program from *Acorn User* contributor Peter Sandford is aimed at anyone who uses figures, and wishes to improve the quality of their work.

ViewChart takes your numeric data from a *ViewSheet* or *ViewStore* file, or manual input, and plots various chart formats to screen. In one plot you can produce between one and five piecharts, stacked bar charts up to 25 bars, grouped bar charts up to 24 bars and line graphs with up to five lines each of 40 plotted points.

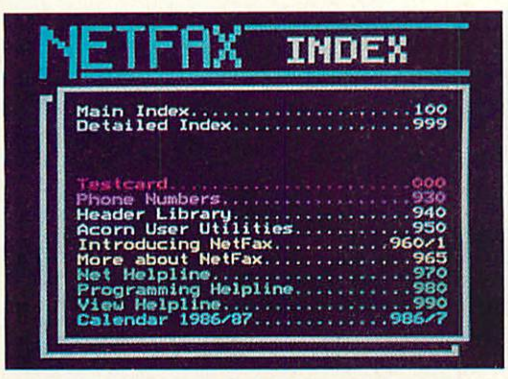
In practice, most business presentation data such as sales figures, departmental breakdowns, cost analyses and so on can be presented in a form even the boss will understand!

You can even add extra text and graphics to the completed chart prior to saving or printing. A screen dump program is provided, for Epson and compatible printers, which is specifically designed to fit the width of an A4 page. Instructions are provided on interfacing to other printers. *ViewChart* works in screen mode 0, using full shading effects, so what you see on screen is what you get on paper, and includes some tips on final presentation of graphics in documents.

ViewChart is supplied on 40-track 5.25-inch disc and works on the BBC models B and B+ and Master 128.

And the price of this professional software? Just £12.95.

DISCS



Network utilities for better communication

BBC B/B+/M/C The *Network Utilities* 80-track disc is the logical addition to your network, combining invaluable routines with a sophisticated yet easy-to-use noticeboard.

Included is *Netfax*, our own hybrid information system providing access to thousands of pages of information. Other special features are: a file locator and directory size finder; network manager utilities including a bridge compatible screen viewer and a 'notify all' facility.

Plus there are 150 *Netfax* pages covering instructions, help and indexes, all on a 5.25-inch disc for £19.95.

DISCS



Disc for all sideways RAM users

BBC/B/B+/M/C The *Sideways RAM Utilities* disc includes: *RamPad* – your computer's answer to the pad and pen. *On-Screen Fonts* – a variety of print styles available in all graphics modes. * HLP ROM – add your own help text to call up when you're stuck. Standard ROM header for use when writing your own ROMs. * RLOOK to examine the contents of your ROMs and sideways RAM images.

There are many more utilities on this 40-track 5.25-inch disc with a transfer program for 80-track users, and it's competitively priced at £9.95.

Acorn User order form on page 130 – 24 hour telephone service (0672) 40825

OFFERS

GALLERY DISCS



Gorgeous screens with our Gallery discs

BBC/B/B+/M/C/E *Acorn User's Gallery* and *Gallery Collection* discs are now in 3.5-inch format for Master Compact users. Each disc is a giveaway at only £6.95, the same price for all formats. Both discs have over 20 brilliantly digitised and stunningly produced screens that will automatically scroll for your amusement, or you can load them all individually to have a longer look.

The screens on the *Gallery* disc include some old favourities, such as Thomas the Tank Engine, as well as some new ones that will amaze, tantalise and entertain you.

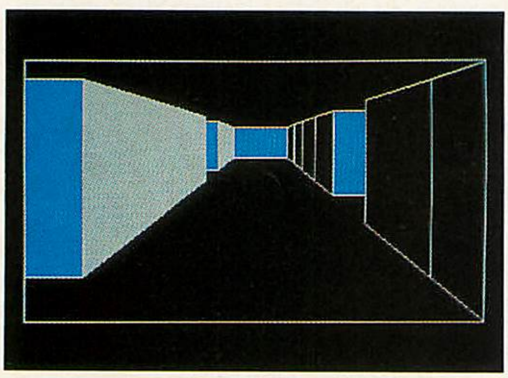
The *Gallery* disc also has *Super Painter* and *Pixel Editor*, so you can do the creating. These two programs can be used in conjunction with the screens we give you to alter and improve them, or you can create totally new graphics screens of your own.

The rich and the famous, or sometimes infamous, put in an appearance. Tony Hancock is on the *Gallery* disc, as is Max Headroom. On the *Gallery Collection* disc, Spitting Image and the Dallas crowd are in vivid colour in the company of Henry VIII, and everyone's favourite, Bugs Bunny.

All the screens on the *Gallery Collection* disc come in compressed form with a programme to help you compress and expand your own screens, so saving valuable space.

Whether you choose 3.5-inch or 80-track or 40-track 5.25-inch format, you'll be getting great entertainment value.

CASSETTES



Games galore in our compendium cassette

BBC/B/B+/M/E You can guide Shuggy around his garden; puzzle over *Puzzle*, and be *3-D* amazed. Or destroy submarines with *Run Silent, Run Deep*. And for the really adventurous, go round the *Acorn User* office.

Best of all, try the truly different *Adventure* game written especially for the *Games Compendium* cassette by Rob Anderson. It's excellent value at £3.95.

You will also find David Acton's *Spectramania* and *Quadline* on this cassette: beat your micro, get four in a row. All are easily transferred to disc.

DISCS



Graphics utilities for your screens

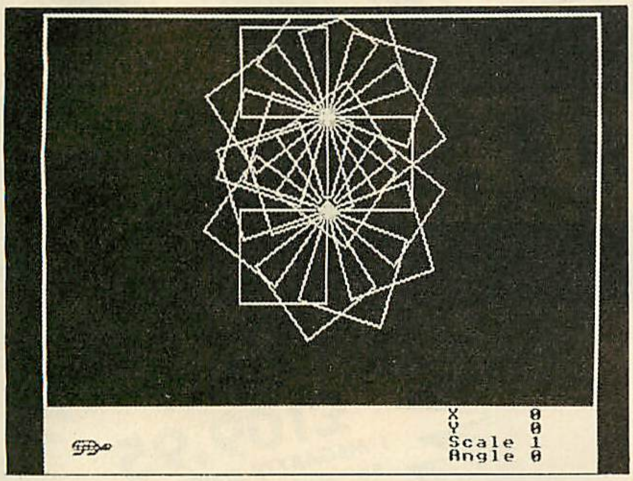
BBC/B/B+/M/C The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 routines to manipulate blocks of graphics: rotation and reflection, a screen compressor/expander, a colour flood-fill routine and three mode conversion commands.

With the Basic procedure library are multi-height, proportional and justified text and 'drop shadow' boxes. A teletext screen editor gives point plotting, line drawing, rubber banding and flood fill, along with all mode 7 control codes. All can be used in your own programs..

***Acorn User* order form on page 130 – 24 hour telephone service (0672) 40825**

OFFERS

EDUCATION



Easy learning with Education disc

BBC/B/ B+/M/ C

The *Acorn User Education* disc makes learning easy and entertaining. The disc is packed with useful programs, including *Eco-Fax*, the sophisticated viewdata-type database for use on Econet systems.

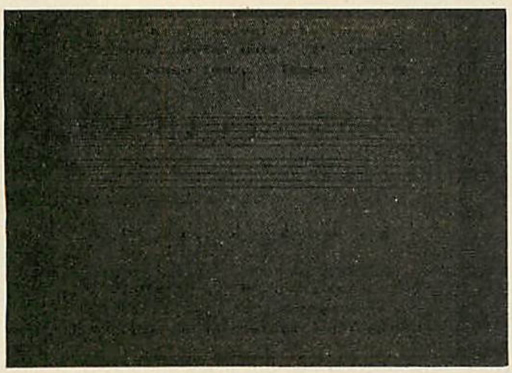
You can also have fun with the colourful version of *Turtle Logo,* the popular drawing program. Try plotting equations with Nigel Jennings' graph program.

Graphics programs are the feature of this disc and they include *Bulletin*, which converts your micro into an electronic message board. Strings of up to 255 characters can be screened in large colourful sideways scrolling letters. Create screens with the drawing program *Easyplot* and then use the two display programs *Vufoil* and *Noticeboard* to show them off. *Vufoil* acts in place of an overhead projector while *Noticeboard* builds and displays your *Easyplot* screens.

We have also included two screen dumping programs: George Hill's all-mode dumping routine for Epson-compatible printers may be incorporated into your own listings, and so may the teletext dumping routine which dumps in mode 7 to Epson FX80-compatible printers.

Our *Capitals* program will force all text into upper case. Budding Bachs can use *Tunemaker* to edit and play back their own masterpieces. This wonderful disc comes in 40-track 5.25-inch format only, but is easily transferred to 80-track. The *Acorn User Education* disc is yours for only £7.95.

CASSETTE



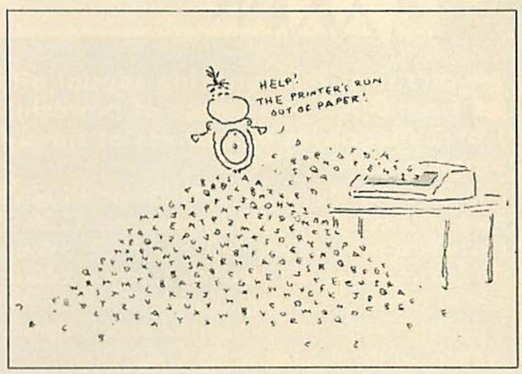
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DISCS



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REVIEWS

GAMES

THE GAMES PAGE

David Lawrence's monthly review of new releases and new tricks.

This month seems to be the time for new releases; most of the major software houses have new games. Superior Software have two. The first is a sequel to *Strykers Run* and is currently called *Strykers Run II – Codename Droid.* It will feature John Stryker again, but this time he must explore four zones finding useful objects à la *Citadel.* The other game is *Crazee Rider*, a follow up to *Overdrive.* The Electron version of *Overdrive* is Superior's biggest selling game, and *Crazee Rider* is the result of many pleas from Electron owners for a racing game with proper corners! The game is a motorbike race and will contain a number of different tracks. It is meant to be a bit of fun, so you get points for ramming other bikes off the track!

Bubble Bus, a software house new to the BBC mirco market, have released the popular Spectrum game *Starquake.* This features very smooth graphics and a huge (over 500 rooms) map. See the review in this issue. Bug Bytes latest cheap games, *Hunkidory* and *Uranians* are nothing new, but at only £2.99 represent quite good value for money. *Hunkidory* is a platform game from Peter '*Thunderstruck*' Scott, while *Uranians* is a very simple twitch game: just left, right and fire.

Meanwhile, Audiogenic are releasing Peter Scott's (the very same) latest game *Omega Orb.* This will be very much in the *Thunderstruck* vein, with lots of puzzles. No less than two BBC micro versions of *Gauntlet* should be available soon. The first is Audiogenic's *Ransack* and the other Tynesoft's *Phantom.* Audiogenic's other successful author, Gary Partis, has come up with *Sphere of Destiny*, a very simple idea that is almost impossible to play! His latest project, *Daxis,* is currently being compiled and should be ready soon.

Apart from *Phantom,* Tynesoft will be releasing a BBC version of the highly successful Commodore 64 game, *Spy vs Spy* – the game based on two spies in the *M.A.D.* comics. Also a game based on *Who Dares Wins* is possible.

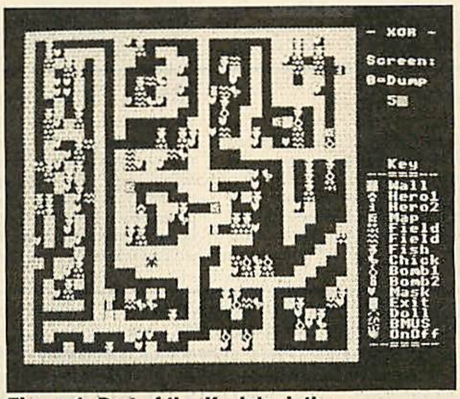


Figure 1. Part of the *Xor* labyrinth

On the adventure front, Domark should have a game based on the new James Bond film *The Living Daylights* out by the summer. Robico are working on *Village of Lost Souls* – the first of a trilogy for experienced adventurers. The BBC version of their successful spy adventure *Rick Hanson Trilogy* (apparently named after the manager of Superior) is also available from them.

Finally, Logotron have released *The Xor Designer* – a screen and sprite designer for their *Repton*-type game *Xor.* You can design fiendish puzzles for your 'friends' and change the fish and chickens into something sensible! Facilities for saving your route and dumping the screen to printer are also provided.

Before I go any further, I would like to mention Superior Software's financial results for 1986. The company's annual turnover increased by 104% on the 1985 level (which was in turn 64% higher than 1984). It shows the market is still buoyant and profitable for the company which can produce the 'right' games.

After my request for clues for *Doctor Who,* I have had replies from D A Backhouse and Ian Tomkins. They both provide some very useful hints. Holding down 'U' and Jump gives you a higher jump, and you can disable the controllers (Daleks) with the cloth in the greenhouse. Using these two hints I have managed to finish the game with a score of 9420 – has anyone scored higher?

If you're stuck on Martech's *W.A.R.*, try loading Game 1 (or Game 2; then ?&52BC=&A5 and resave it. This will give you infinite lives (yawn) – but at least gives you a chance to see the last two levels on Game 2 (hard luck Uncle Clive!) Thanks to Matthew Hughes for that. Mike Horend has sent in a poke for Bug Byte's *Plan B*; load in the file called PlanB, then enter ?&3F01=50 and CALL &4CB3. Nothing obvious will have happened until you pick up a key or open door... *Stryker's Run* owners with a Master may be interested in this little 'feature'; while on the options screen with the scrolling message, hold down the keys C,H,R,I and S and then start the game with option 1 as usual. You can now scroll the background scenery with the left and right cursor keys and admire the excellent graphics without having to shoot everything! Thanks to the real Richard Hanson at Superior for that.

I now have a complete set of maps for *Xor*; (see the example in figure 1). If you would like a set send either a sae (9 by 12 inches) and a cheque for £1 or a blank formatted disc (marked 40 or 80-track) £2 and return packaging to *Xor* Maps, *Acorn User*, 141-143 Drury Lane, London, WC2B 5TF. We are providing the screens on disc as they very detailed and are much clearer on a monitor or TV.

Rob Miller's *Ravenskull* maps are also available now, together with some hints for the first level. Send a cheque for £1.50 to '*Ravenskull* Maps' at the address above.

I'm now off to use the *Xor* Designer and change the heroes into lizards, the masks into diamonds, the fish into boulders...

GAMES

SPORTING CHANCE



'Daley Thompson's Super-Test', Ocean, BBC B, Cassette £8.95, Disc £12.95.

The latest in a series of sport-type computer games is *Daley Thompson's Super-Test* from Ocean. Unfortunately, it's just another (poor) conversion from the Sinclair Spectrum and Commodore 64 machines and doesn't do justice to the superior capabilities of the BBC micro.

Super-Test consists of eight events, four on each side of the tape. On day one the events that you face are pistol shooting, cycling, springboard diving, and giant slalom. Day two consists of rowing, penalties, ski-jump, and tug-of-war.

In this type of game I group the events into three categories: moronic keyboard smashers; infantile keyboard smashers; and not so moronic and infantile keyboard smashers. Of the eight events, cycling, rowing, ski-jump, and tug-of-war come into the first category. Springboard diving, giant slalom, and penalties enter category two. Only one event is in the last category – pistol shooting, which, although difficult to play, is quite fun when you get used to the keys.

As with most games of this variety, it's very difficult to have realistic sound. Even with that in mind, I was not impressed by the sound in *Super-Test*.

Now for the good points. *Super-Test*, unlike many similar games, allows you to continue with the events even if you haven't qualified — you can go on to the next event without completing the one you are on. You just lose a life. Lives left are displayed as a line of runners, one of which fades away every time you fail to qualify, which is a nice touch.

The important question that has to be asked is, how does it rate compared to the other sports games. In my opinion, *Super-Test* is superior to Tynesoft's *Commonwealth Games*, but is below the standard of Alligata's excellent *Olympic Decathlon*.

Super-Test isn't very original. If Ocean had come up with some events that genuinely required some sort of manual dexterity (and a bit of thought) it would have been interesting. Please try harder next time Ocean.

Richard Bellis

ADVENTURE TRILOGY

'The Ket Trilogy', Incentive Software, BBC B/Electron/Master, Cassette £9.95, Disc £11.95.

The Ket Trilogy consists of three separate adventure games, all on one tape. According to the cassette case, all three are: 'Giant adventure programs, which combine to create the colossal *Ket Trilogy*'.

When I played them, I discovered that they weren't quite so giant. Like most adventure games, they are text only, but Incentive Software has at least added some bright colours to the games to liven them up a little bit.

I wandered aimlessly about for a little while until a cartographer approached me. The computer asked for my next move. For some fun and action I typed in: KILL MAN. I was presented with a status screen showing my energy and my opponent's energy. As we battled through nine rounds, our energy slowly decreased until the computer announced that I had finally 'got him'.

The instructions supplied with the game confused me at first, because I didn't know where to start. They are on a single sheet of paper, on both sides, and half of it is upside-down.

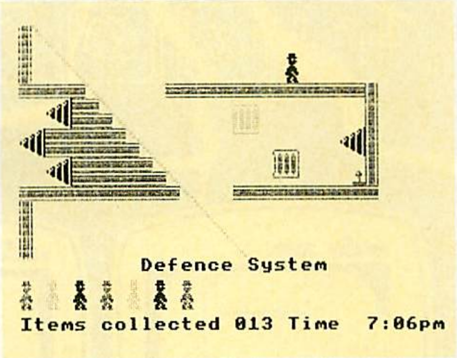
The program understands a wide range of words, and it will pull a recognised word out of an unrecognised sentence if possible and question you about it. It also has a wide range of cheeky replies if it is confused by a sentence or word. The program also accepts mis-spelt words, provided, of course, they are not completely wrong.

My main criticism lies on the fact that there aren't many clues. Once you've been around the village and wood a few times, without much luck in finding the secret path to the mountains, you begin to want to give up. Then I noticed a 'Helpful tips' section in the instructions. They suggested I try typing 'HELP' if I was stuck. I did and the reply was: 'You're on your own'.

I'm not the most patient adventurer, but these kept me going for a while, with their amusing remarks and unusual situations. Being a three-in-one game prevents me from saying it's bad value for money; but buy it only if you are a keen, patient adventure fan.

Sam Greenhill

WILLY JETS OFF AGAIN



'Jet Set Willy II', Tynesoft, BBC B/Master, Cassette £7.95, Disc £12.95.

Well here it is, the sequel to *Jet Set Willy*. *Jet Set Willy II* no less. The review disc came in a plastic disc case, and on the reverse of the inlay card were the loading instructions for a cassette!

Anyway, on to the game itself. Those people who hated *Jet Set Willy* will hate the sequel even more. And those of you who loved it will love it just as much and probably a lot more.

The game is similar to the original but Willy's mansion has been extended and contains a lot of new rooms — over 100 now, according to the inlay card. I can't say I've seen them all and I don't think anyone will for quite a long time yet. But how did the mansion get its new rooms, I hear you ask. Well here's the answer.

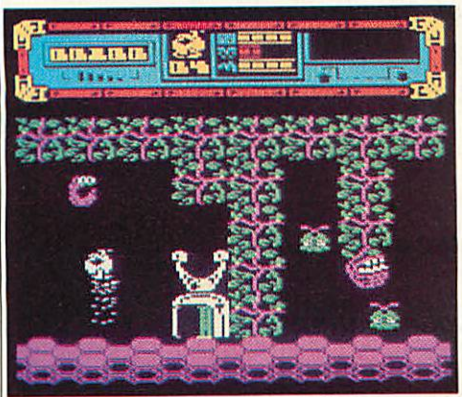
The mansion needed work doing on it in a hurry and so Willy called in some builders. He thought it a bit strange that they had green skin. Not only did they carry out the work asked for but they added lots of new rooms and refused any payment! Maria (Willy's housekeeper for

those of you who didn't know) is furious that the builders left such a mess and demands that Willy clears it up. This isn't easy as Willy hasn't even discovered all of the new rooms yet. There's even a Rocket Room for space travel! As you may have guessed you take on the part of Willy roaming his mansion collecting all sorts of different articles, the aim being to collect them all. This is no easy task as there are a lot more than in the original.

At various points in the game the disc drive whirrs into action, I assume to load some more screens. This can be irritating, especially when you just leave a screen and then suddenly change direction and go back to where you came from. Doing this causes it to load twice. Apart from this small niggle the game's extra screens really do make it superb and enjoyable, and I would thoroughly recommend it to anyone who liked the original Willy.

Chris Hart

AT THE EARTH'S CORE



'Starquake', Bubble Bus Software, BBC B/Master/(Electron soon), Cassette £9.95, Disc £11.95.

At long last, some other software houses are taking an interest in the BBC micro! This new release from Bubble Bus Software has all the ingredients of a great game.

The plot is very simple: Blob (your character) must rebuild the planet's core and save the universe! As well as pieces of core, there are many other objects littering the maze. Most objects mentioned in the accompanying A to Z are self explanatory but I have no idea what a 'Flexible Thingy-doo' is, or for that matter, what you do with one when you've found it!

Movement around the planet is with the usual up/down left/right controls, although up does not always work. Fortunately suitable transport is provided – it's a lot less bovver to hovver! If wandering around on foot sounds too much like hard work, you can always take the nearest teleport (15 in all) to jump elsewhere in the maze.

The ever-present meanies are always on hand to slow you down, although a few carefully placed shots with your trusty zap-ray can do wonders.

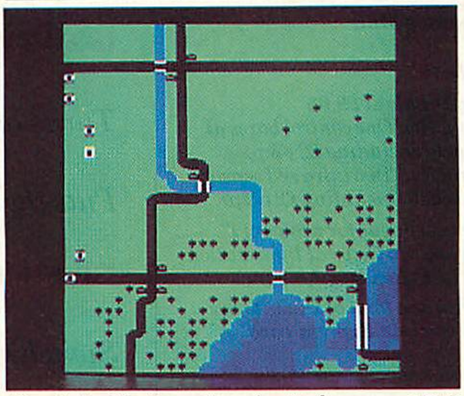
At first, it's difficult to know what you're supposed to do, but of course, as it's an arcade adventure, that's the idea. Once you've found the planet's core at least you'll know what you're looking for! With over 500 different screens, there is plenty to explore. The planet is worth mapping – in fact, it's almost essential once you get into the game.

The graphics have a Spectrum look – not surprising as the game was converted from the original on that machine. Sprites are fast and smooth, using a mode 5 screen with six colours. The sound is good if a little loud, with provision for turning it off.

Even though the theme is not particular original, *Starquake* is fun to play. It's varied and big enough to keep you engrossed. The asking price of £9.95 may be a little high, but I would still recommend it to anyone who enjoys an exploring/zapping combination game.

Robert Miller

ON THE WARPATH



'Tanks', Design People Software, BBC B/Master, Disc £12.95.

Tanks is a disc-based warfare simulation game which gives you a chance to emulate Rommel and Montgomery. Three scenarios are available: Western Europe, North Africa and the Russian winter. Each scenario gives a different landscape and a choice of tanks relevant to the battle zone. The aim of the game is to move tanks and support units across the countryside in order to reach and capture the objective. In some games the objective is close at hand: in others it is across the board from the starting position.

After choosing the battle scene, forces on both sides are allocated from a variety of tanks (with different fire-power and manoeuvrability) and support units (a list of typical forces for each scenario is giving in the instruction pamphlet which is provided with the game).

Enemy fortified positions are marked on the map as pill-boxes but enemy tanks are hidden from view until they are within range. Tanks and support units are moved around the map using the keyboard and a cursor. On placing the cursor on a piece, a more detailed 15 by 15 square map is displayed. This screen contains information on the status of the piece to be moved – that is, its make, speed and numbers of moves available. On engaging an enemy tank another close-up screen of the two tanks is loaded from disc and then the battle commences.

The tanks are stationary and fire shots at one another until they run out of shells or one of the tanks is destroyed. Damage reports are given at the top of the screen and even minor damage may take a number of moves to repair.

The computer moves all of its pieces in a fraction of a second. No encounters occur on the computer's move. However, the enemy does have bombers which frequently fly overhead and those of your tanks that are not under cover in forest are extremely vulnerable to aerial attack.

Finding a path to the objective, avoiding and defusing mines (using sappers), hiding from enemy bombers, attacking fortifed positions with mortar units or artillery and keeping tanks refuelled in order to reach the objective make this a very intriguing battle-style game.

Add to this the necessity of protecting the more vulnerable petrol tanker, mortar units and sappers, then this game is one of the best warfare simulations available on the BBC micro. Highly recommended without reservation.

Ashley North

SOFTWARE

MOVABLE MACHINE CODE

Graham Bell discovers that a powerful assembler has advantages over the built-in program

Most programmers get along fine without touching a specialist assembler at all. For beginners and those creating little programs, the BBC's built-in Basic assembler is adequate. But if you have some assembler experience and are more ambitious, the *Mijas 65C02 Development System* is a much more professional way to write assembly language.

Machine code for the 6502 processor cannot be shifted. If it is written to run at memory address &900, it won't work at any other address. Special short routines can be assembled that are relocatable, but they cannot contain subroutines for example. To relocate the code, internal subroutine calls must be modified but external calls like JSR &FFEE must not be changed.

A relocatable assembler like the *Mijas Development System* doesn't magically create code that can be run at different addresses. What it does do is make it easy to reassemble versions to run at any address you want. You can quickly assemble a new version, with all the internal absolute addresses modified automatically.

The process of creating runnable machine code with the *Mijas* system is summarised in figure 1. This is contrasted with the steps required with the BBC micro's built-in Basic assembler, and an absolute assembler like the original *ADE*.

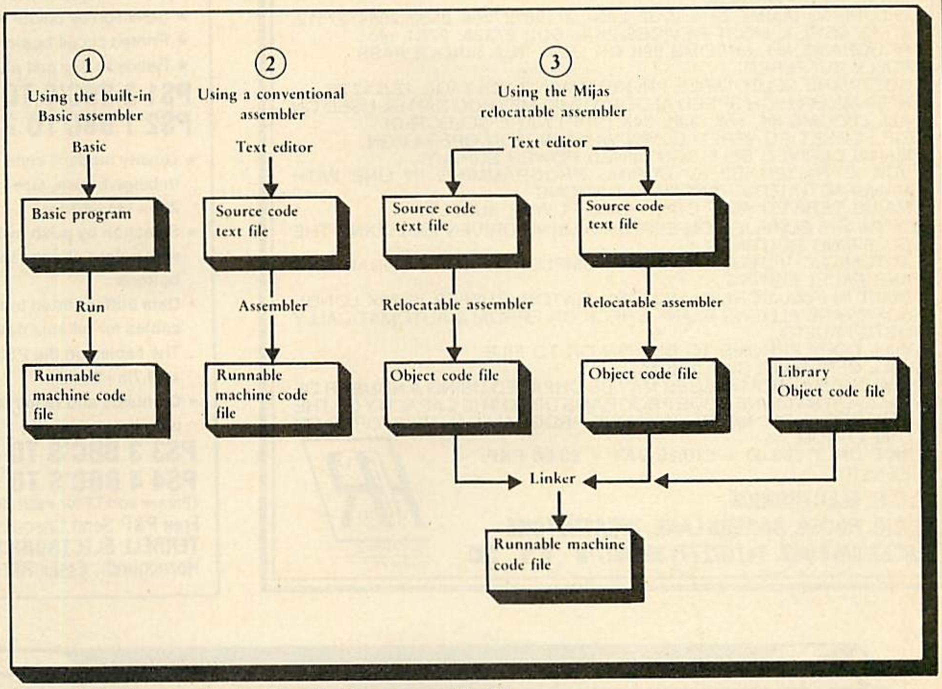


Figure 1. Various methods of producing a runnable file

The first step is the creation of source code. This is the assembler program containing of mnemonics like LDA. The *Mijas* system also has 21 pseudo commands to make it easy to assemble data and control the memory areas used by code.

The second stage is assembly. This is achieved with a star command *ASMB which produces an 'object file'.

The third and last stage is the unique bit. A program called a linker reads the object file and changes the internal address references into the correct absolute addresses. This produces a runnable program.

The *Mijas* system adds a few further twists to this theme. First, your program can be modular. Parts of your code can be assembled and tested separately before being linked into the grand overall program. Each module can refer other modules via an external reference command EXT, so one module can call subroutines held in other modules. The linker sorts out all the cross-references at the end.

Some useful routines are provided in a library module. However, as with much of the system, they would benefit greatly from more extensive documentation. Of course you will amass your own collection of useful modules and subroutines, which can be re-used in later programs.

Installing the system can be done in a variety of ways. There is a sideways RAM version of the assembler and linker as well as a disc-based version, supplied on both a gaily-coloured 40 or 80-track DFS-format disc. An optional ROM is also available. Only the disc-based version can be used over the Tube.

Any normal wordprocessor can be used to create the ASCII file source code. The Master editor, *EDIT*, is ideal. The *Mijas* package includes a text editor that can just about be used to write the source code, but it should only be a last resort.

The format of the assembler mnemonics is similar to that of other assemblers, with one or two slight differences, for example the assembler won't allow the use of internal addresses as single bytes. If you are used to writing assembler programs already, then your personal style will most likely have to be modified a bit.

Assembling and linking the object code is quite straightforward. A clear step-by-step guide is given in the manual, and the disc contains an example file to practise on. Error messages tend to be rather cryptic, but the worst ones are clearly explained in the manual.

A useful debugging option is available, for use with the separately supplied *Mijas Source-level Debug* package. This provides all the usual trace and modify facilities of other machine code monitors. Its unique merit is that the original source code can be inspected. It scrolls past in a separate window, complete with labels and so on, while the code is being executed.

Mijas Development System and Mijas Source-level Debug package are available at £22.50 and £20 respectively, including VAT, from Mijas Software, PO Box 2, Sutton Scotney, Winchester, Hants, SO21 3LU.

SOFTWARE

HOW DO YOU SPELL...?

How often have you seen an embarrassing mistake after you've printed a file? Bruce Smith has the solution

If you believe what you read in Acorn Abuser's Diary (and some people do) then it comes as no surprise to learn that I was given the opportunity to review the latest offering from Computer Concepts – *Spell Master* – and compare it with Acornsoft's own word wizard, *ViewSpell*.

A spell checker is a program to check your spelling. What it cannot do is to intelligently correct and change a spelling mistake for you; for example, because both 'their' and 'there' are correct words, it can't tell when you've used the wrong one! The checking program has a dictionary of words, called a 'master dictionary'. It looks at each word in your document and tries to find it in its master dictionary. If it succeeds, then it judges the word is correctly spelt. If it cannot then it signals the fact.

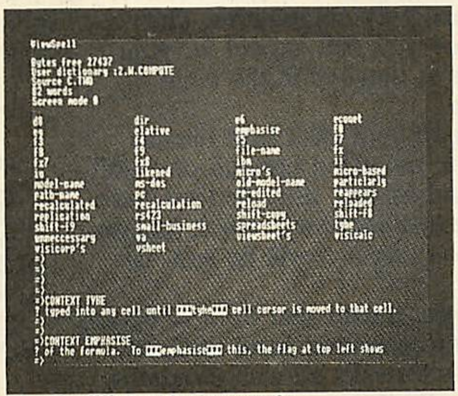
Of course there are limits to the number of words that can be stored in the master dictionary, and so some correctly spelt words will be flagged as 'incorrect' simply because they cannot be located in the master dictionary. Any spelling checker worth its salt will allow you to build up user dictionaries. These, as their name implies, are dictionaries of words which you can add to, thereby increasing the overall vocabulary of the spelling checker.

ViewSpell and *Spell Master* have both gone about the task in hand in rather different ways. Let's look at each in turn.

ViewSpell

The *ViewSpell* pack comes with ROM, disc and manual. The ROM contains the driving firmware and is inserted into one of those well-worn ROM sockets. The master dictionary is held on a disc. *ViewSpell* can only check documents written in *View* or spooled from another wordprocessor to an ASCII file. It cannot be used to check an ordinary *InterWord* file for example, but can check a file spooled using *InterWord*'s menu option 8. Any file to be checked must be saved to a disc, and cannot be checked directly from within the wordprocessor.

Typing *SPELL drops you into *ViewSpell* which looks very much like any other *View* family screen. A dual disc drive is best, though not essential, so that you can place the dictionary disc in one drive and the data disc with your text in the other. The document file is then loaded into *ViewSpell* in the normal manner, ie, LOAD <filename>.



***ViewSpell* lists unknown words**

The loading process is not a standard one as *ViewSpell* reads in the file word by word, compiling as it does an alphabetical list of unique words contained in the file. It keeps only a single copy of each new word it encounters – there may be 15 occurrences of the word 'View' but the program just keeps a record of one. The list of unique words can be seen by typing LIST.

Once the unique word list is complete, the spelling check can commence. It is set in motion with the command CHECK. The disc drive with the dictionary disc now comes to life, and each word is compared with the dictionary. As the words have been sorted into an alphabetical order the disc access time is kept to the minimum possible, and it doesn't vary all that much even if the unique word list is very long. As each unmatched word is found, it is noted. When the master dictionary has been checked, any predefined user dictionaries may also be checked, if desired. On completion of the check the number of unmatched words it has found is displayed and this list can be seen by using LIST.

It is now up to you how you utilise the list of unmatched words. You can use the MARK command to write the document back to disc but with each of the unrecognised words marked by '#!' or any other two-character combination. This file can then be loaded into *View*, and the SEARCH command will step to each of the marker characters where the word can be edited if required. Alternatively you can save or print the list of unrecognised words and correct these using SEARCH <word>.

Spell Master

Computer Concepts' *Spell Master* ROM is rather like a multi-storey car park! Its two ROMs (totalling 128k of memory) are fitted onto a small board which in turn plugs into a ROM slot. On the BBC and Master the board sits comfortably with other ROMs around it. On a Master Compact it must be fitted into one of the slots nearest the back as otherwise it will foul the keyboard.

I used *View* to road-test *Spell Master* to provide a comparative test with *ViewSpell*, and also because I think it's still the best wordprocessor for a BBC micro. However *Spell Master* will work happily with *InterWord* and *Wordwise*.

Unlike *ViewSpell*, *Spell Master* allows you to check your text while it is still in memory. Checking can be performed in a variety of ways, but the easiest is to check the entire document when it has been completed. This is done from *View's* Edit mode screen by pressing CTRL-J. A menu drops down from the top of the screen and checking can be selected from here.

Spell Master does not build up a list of unrecognised words – instead it displays each unknown word in inverse video and surrounded by a line or two of text so that you can be sure of the context the word is being used in. When used in *InterWord* the current screen is shown in its entirety and the cursor sits on the first letter of the doubtful word. A menu offers three options which are 1) Ignore word, 2) Add word to dictionary and 3) Correct word. Pressing Escape aborts the check.

Option 1 is self explanatory, and option 2 is dealt with below. When you press option 3, *Spell Master* displays what it feels to be

the best match to the word that you actually wanted. The six words that follow it in the dictionary in alphabetical order are also displayed.

If the guessed word is the correct one, pressing the Return key will correct the spelling in the text. You can scroll up and down the the dictionary looking for a correct spelling. Alternatively, if you have totally mis-typed the word, re-typing it on the keyboard will move to the correct position in the *Spell Master* dictionary.

You can check text from a specific point by moving the cursor to the position required and by pressing CTRL-V. Single words may also be checked by positioning the cursor under the word in question and pressing CTRL-C.

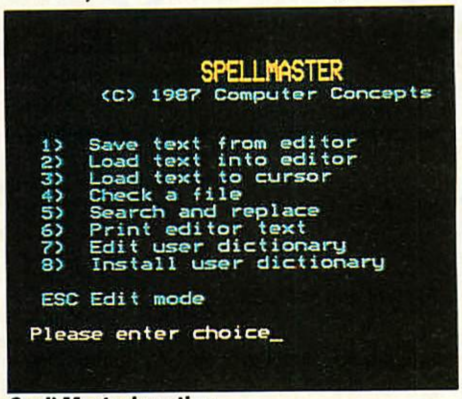
One fundamental omission from *Spell Master* is the ability to re-type completely a word from within the checking procedure. For instance, on a number of occasions I found that I had concatenated two words by omitting the space between them – a quite common typing error – but the only way that I could correct this was to leave *Spell Master*, SEARCH for the word and then insert a space between the two.

Spell Master also allows you to check the spelling of words as you type them in. The checking rate is stated as 10,000 words per minute so even the most frenetic typists will have no problems. An incorrectly spelt word will be signalled by a small beep.

Spell Master will not work with versions 1.0 and 1.01 of *InterWord*. With later versions it is readily available as a menu option and works as described above. Surprisingly, a 1200-word document took a couple of seconds longer to check in *InterWord* than it did with *View* (version 3.0) which was checked as correct in just 10 seconds. The same text once loaded into *ViewSpell* produced 435 unique words and took nearly four minutes to check! The large difference is because of the use of ROM instead of disc storage for the *Spell Master* master dictionary.

Spell Master can also be entered as a language. Typing *SPELL (an unfortunate choice as *ViewSpell* also uses this command) drops you into the now familiar Computer Concepts front screen. A very simple text editor is available and it is possible to create documents here – but the facilities are very limited. Files can be loaded, checked and saved from the text editor and it is also possible to load in a user dictionary for editing or adding to if you should so desire.

Even on expanded Beebs with shadow RAM boards, memory is still limited. Very long documents cannot be loaded into memory for checking, for example files created on a second processor. In these cases (and with smaller documents too) disc files may be checked like *ViewSpell*. Unrecognised words are marked in a new checked file for subsequent editing.



***Spell Master* in action**

The editor contains one nasty feature in that it does not check to see if there is enough memory to load the file into the currently selected Editor screen mode. If there isn't enough, then the system hangs up – sloppy programming.

User dictionaries

The *ViewSpell* master dictionary is said to contain about 70,000 words, though listing the master dictionary supplied only 12,000 words. *Spell Master*'s is 57,000 words. Even though this might sound surprisingly big, your documents will always contain words that are correctly spelt but are simply not in the master dictionary. Both checkers allow you to add user dictionaries, which can have words added to them.

ViewSpell's user dictionaries are disc based, and are named files. In this way it is possible to build up a collection of specialist dictionaries, for example, a dictionary of computer terms, one of medical terms, one of musical terms, and so on. Once a user dictionary has been defined (using the CREATE command) words can be added (or deleted) using the command AW (or DW). Files of words can be built up in *View* and the dictionary itself made by use of an *EXEC file. The unrecognised words left over after checking a document can be put into the dictionary too.

Once the user dictionary has been created, a dictionary can be specified once in *ViewSpell* by using the USER command. Once the master dictionary has been checked *ViewSpell* will then look through the allocated user dictionary.

Spell Master continues its use of memory rather than disc by constructing its user dictionaries in sideways RAM. To use *Spell Master* efficiently you must have sideways RAM. A user dictionary is created from the *Spell Master* main menu and simply involves you selecting the correct menu item and entering the sideways RAM slot which is to contain the dictionary. There may be more than one user dictionary.

Adding words can be done in two ways. The most obvious is from the checking sequence when unrecognised words are added by selecting option 2 from the selection of three (see above). Alternatively they can be created in the text editor and installed into sideways RAM from the main menu. User dictionaries are loaded with *DLOAD and saved with *DSAVE. Very simple, very easy to use, very quick and very effective, but you must remember to save the damned thing before switching the machine off!

Extras

Both checkers have extra commands, and some (not all) of them are quite useful. Being disc based, *ViewSpell*'s PREFIX command lets you define which drive the text and dictionaries can be found on, and CONTEXT will display an unrecognised word within the line where it is used so you can see its true meaning.

Spell Master has *ANAGRAM and *CROSSWORD to help word puzzle cheats, while the *FUZZY command is useful when trying to locate the spelling of a word that you only have a rough idea of.

Verdict

Really there's only one choice, and that's *Spell Master*. But it does have one annoying bug when being used with *View* – for some reason when checking files it will occasionally decide to turn the edit mode screen off, which means that you have to press the Break key to get into command mode, save your text and then CTRL-Break to restore the computer before setting up again. Despite that drawback, it's an excellent piece of software and gets the Smith seal of approval, for what that's worth, and ensures that my speeling will bee corekt en futor hopefullee.

SOFTWARE

BIG BANG ON THE BBC

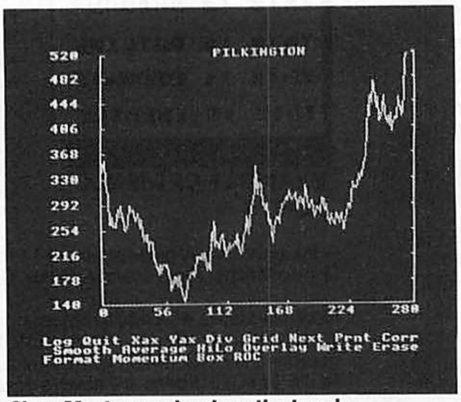
Could you and your micro earn some serious money in the City? Michael Leete plays the market

Taking decisions by combining the disciplines of mathematics, probability and statistics perhaps started during the Battle of Britain, when very limited resources had to be deployed as effectively as possible. This analytical technique began to be applied to the Stock Market around 1971 with the publication of *The Art of Investment* by A G Ellinger. Since then the 'chartists' have gradually established a reputation among professional investors. Following the introduction of electronic dealing systems, dubiously called the Big Bang, the chances are that the market will become far more sensitive to charting influences and the investor, both amateur and professional, should now cultivate a greater knowledge and awareness of these methods.

In a nutshell, the chartist collects price information about particular shares, plots that information in various graphical forms and learns to interpret the results to identify critical points in the share's performance. *ShareMaster* offers the chartist's graphical facilities in every imaginable configuration. If you decide to lash out a hundred pounds on *ShareMaster*, don't place a firm order for a private aircraft straight away – there is a little more to be done before you find yourself up there with Paul Getty. On the other hand, the program represents value for money which does not seem to be equalled in its field.

What you get for your money is a ring-bound manual, a floppy disc and a dongle disguised as an analogue port plug.

The manual is excellent, although ideally I would have liked to have seen an index or, at the very least, page numbers on the contents page and the syntax of one or two sentences may make you catch your breath. It is arranged in the same order as the menu and sub-menus and takes the user through every program operation in easy stages. The final two sections are a potted tutorial on charting with examples from the numerous graphical forms that the program provides. The ability to vary the scaling and configuration of the graphs virtually instantly is quite amazing. Precise details of all the available graphs are in-



***ShareMaster* graphs show the trends**

cluded in a leaflet obtainable from Synergy Software. Suffice it to say that I consulted a professional analyst who couldn't come up with a configuration that the program had not got.

While the sales of shares in British Telecom and British Gas may have given the impression that playing the market is better than working, Britoil has sounded a cautionary note. There is real work to be done if the program is to be used effectively. Data must be collected for up to 50 files, each representing one company. The Systems disc already contains weekly prices from a few companies, including those in the FT 30 Index, to enable the user to become familiar with operating the program. New data has to be entered as a regular routine. If the user's interests extend over more than 50 companies, new sets of discs may be prepared to accommodate the excess and, within the total of 50, file data may be swapped from set to set. I would suggest maintaining records of, say, 35 shares in each set, leaving 15 spare slots, for importing files from other sets. In this way any set of data may be compared, 'overlaid' in visual terms, with any other. The program only uses drives 0 and 1 but the owners of double-sided disc drives may turn this to their advantage by using drives 2 and 3 for back-up purposes. Single drives are also catered for.

Data entry can be either daily or weekly and there is a facility for skipping dates if they happen to fall on a holiday. A daily price record is useful in the Traded Options Market, for instance, or for very short term investments but as a general rule, the shorter the time steps the more confusing the result becomes. Novices will probably confine themselves to weekly steps. A useful tip is to avoid Mondays and Fridays. The weekend press and 'New Time' dealing can distort the flow of price movements quite substantially.

Playing with the graphs is great fun although learning to interpret them is quite another matter and is a skill. The manual gives a brief summary of charting techniques and some suggestions for further reading are given. Once completed, text notes may be added to the graph or straight lines rubber-banded onto them to bring out specific points. Graphs may be printed in one of two sizes, with axes roughly 4.5 × 2.75 or 7.5 × 5.0 inches.

The main purpose of the program is analytical. However, in addition, a share dealing record may be maintained using the same files and reports of portfolio valuations and performance may be configured in several different ways. For example, total dividends received or net gains made during a period, such as a fiscal year, may be listed and printed.

The programs will not calculate the Capital Gains Tax payable but the foundations of the computation are readily accessible. Text notes may also be added to the data files either to build up a verbal profile of the company or, perhaps, as a reminder of why a share was acquired. My printed portfolios are littered with such highly technical memoranda as 'Long term hold', 'Gold Club buzz' or 'Jeremy's idea'.

Put at its simplest, a large amount of historial data may be stored, manipulated and accessed by *ShareMaster*. This in itself will be helpful right from the start but with widening experience the program becomes an important decision-making tool. Investment in a company may be fundamentally sound, but timing the purchase or sale of its shares is crucial. Charting techniques help with the timing.

ShareMaster costs £99.95 from Synergy Software, 7 Hillside Road, Harpenden, Herts.

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CJE micro's

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This is COMPTS
This is BOLD
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This is OUTLINE
This is BROADWAY
This is THEATRE

EXAMPLE OF MFNLQ FONTS

FONTAID

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Greek/Maths, Plain, Hand & (Elite, Condensed, & Super Condensed).

Now included is a facility to issue '*' commands within a VIEW document. To download new fonts within VIEW documents, the FONTAID ROM needs to be fitted in the BBC. (All other FONTAID facilities are available on both the FONTAID ROM & DISC). Fonts are always downloaded from Disc.

Fontaid is recommended to Canon & Taxan Kaga owners in preference to Multi-Font NLQ. As downloadable NLQ is a built-in facility of the Printer, full access to all the printers control codes is still allowed. The resolution of the FONTAID NLQ is also slightly higher than that of Multi-Font NLQ.

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CJE micro's

LOOK BEFORE YOU LAYOUT

Presentation is vital for many documents. This handy program lets you see your layout before printing

Graham Bell

Whether you're writing a one-page letter, a business memo or a lengthy report to a superior, presentation can be as important as content. Good quality paper, a daisy-wheel printer and no spelling errors can complement a fine piece of prose, but for full effect, the overall 'look' also has to be right. Trained typists often call this 'good display'. The program described here offers *View* users a way of checking the look of each page before printing. In fact, it will also allow you to check *ViewSheet* and *ViewStore* printed output too.

There are several things that can spoil the look of a document. Margin sizes can be inconsistent or out of proportion to the text and stationery; a poor choice pushes the text into one corner of the page. Attention should be given to the 'shape' of the text, Scrappy little paragraphs, headings that are not distinct enough from the text, lonely lines (a single line of text before or after a page break) and widows (a single word on a line) can all mar this shape. An expert typist acquires a feel for good layout, but with most wordprocessors it is more difficult. Whatever the ads say, what you see is never really what you get. For a start, you see only half a page at a time!

Writing memos

If you write many documents of the same type, perhaps lots of letters, memos or weekly reports, then it can be useful to define a standard style for each. The edit commands that would normally be put at the top of each type of document should be stored in a file of their own, one file for letters, one for reports and so on. The correct file can be used each time you start a new document, so enter:

LOAD MEMO

to start writing a memorandum with a 'style file' called 'MEMO'. That way, all your memos will have a consistent layout. Such a style file could even contain constant elements of the letter or memo itself, or define standard macros to be used later on (perhaps to number report sections). An example style file is shown figure 1.

Once the memo is complete, save it using a different name, eg, 'SAVE TO STEVE'. When finished and printed out, the text in the memo will be formatted according to the various ruler and page layout commands in the initial style file.



Producing good looking pages is a skill

```
CO style file for memo – A5 pica
PL  50
TM 4
BM 4
HM4
FM 4
LM 15
LS  0
DH ////
DF ////
CE MEMO
LJ From:   Ron Sedleigh, Accounts
LJ To:
LJ Ref.:
LJ Date:    ¦D
LJ Subject:
CO room for 20 lines of text + initials
```

NB. *View* edit commands shown bold. Also note use of ¦D to include the date automatically: this will only work on a Master 128 with real-time clock.

Figure 1. Example style file for a typical office memo. This type of file equates with a normal memo form with a consistent layout

Checking

Standard style files can help, but the text still needs to be checked. *View* scores over some wordprocessors, in that there are two useful facilities for checking the eventual page layout before printing. The SCREEN command and the screen driver (which is on the Printer Driver Generator disc) both attempt to show on the monitor screen what would be put on the paper. Other members of the *View* family have equivalent features.

SCREEN is rough but quick. It's most useful for checking the position of page breaks and whether the left and right margins are correct. It does not show the effect of any highlights in the text and what's worse, highlights can spoil the formatting – particularly with tables or a justified right margin, because they take up space on the screen just as in text mode.

The Printer Driver Generator's screen driver, which is used with the PRINT command, is much slower but shows the detail better. It is specifically for checking highlights. Extended highlights are properly interpreted by the driver, and the text is shown on screen exactly as it will appear on paper, including underlining and italic or bold text. The highlights take up no space, they merely change the style of the printing on screen.

Overall look

These two facilities reduce the need for printing proof copies of each document, but they don't eliminate it. The remaining problem is that a whole page cannot be displayed on the screen, only 10 lines of double-spaced text, or less than a third of a sheet, can be seen at once with the screen driver. So while a good check can be made on the details, the overall look of a page may be poor. The solution is to preview the document by looking at a 'picture' of each page as it will appear, and the Basic program in listing 1 gives a way of doing this. This is not an alternative to the use of SCREEN or the screen driver: all three facilities do different jobs and should be used together.

Type in listing 1. Note that the constant

PLOTMATE

A Graphic Illustration



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'Plotter' is too simple a word to describe PLOTMATE. It is, in effect, a highly sophisticated data communications device that greatly extends a micro system's options and capabilities allowing high resolution input and high definition output. It is compatible with all leading micros including the BBC, IBM, AMSTRAD, ATARI and NIMBUS.

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IMAGE SCANNING

PLOTMATE's flexibility is further extended by the use of Linear Graphics' own scanner, LINSCAN. This allows PLOTMATE to function as a sophisticated image scanner producing high resolution pictures that can be used within desktop publishing packages such as Pagemaker, GEM, Fleet Street Editor and Image.

EXTENDED GRAPHICS COMMANDS

The in-built graphics commands of the BBC micro that PLOTMATE understands now encompass the extended graphics commands of the BBC Master such as circle and arc drawing, sector and segment filling, rectangle and parallelogram shading.

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All 'Welcome' disks allow data files produced by the DOMESDAY database to be output in pie, bar and line chart format on the BBC Master.

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'gxr' should be TRUE in *line* 60 if the Acorn Graphics Extension ROM chip is fitted, or if it's incorporated in the machine's operating system as on the Master series computers. If the final page preview program is to be used on machines without the Graphics Extension, then leave 'gxr' as FALSE. With this proviso, the program is compatible with all BBC or Electron machines that run *View*, and with any version of *View*.

Save the Basic program, then run it. If there are no errors, the program will assemble and automatically save the machine code file 'V.PAGE'. ADFS users will have to create the sub-directory 'V', or change the filename in line 90 to just 'PAGE'. The V. PAGE file is a *View* printer driver. In *View* command mode, load it with:

PRINTER V. PAGE

Once loaded, V. PAGE will work in any of the bit-mapped graphics modes 0, 1, 4 or 5, or their shadow equivalents on a B+ or Master. If the display mode is mode 2, text-only or teletext (3, 6 or 7), then it must be changed to one of the other graphics modes. Modes 4 or 5 are probably best for long documents, as they leave most memory free.

Now any document can be previewed with either of the PRINT or SHEETS commands. For example, to preview a *View* file called 'CHAPT17', type:

SHEETS CHAPT17

V.PAGE draws the outline of each piece of 'paper' on the screen, then adds the words in the form of small black bars rather than individual letters. Obviously the words can't be read, but the overall proportions of the page can be judged. It is possible to check the page layout, the relative sizes of top and bottom margins, the shapes of the paragraphs, and what media chaps tend to call 'the creative use of white space'. An example page is shown in figure 2.

With PRINT, move on by pressing the space bar when the 'Next page . .' prompt is displayed. With SHEETS, at the normal 'Page n' prompt press M to miss out or any other key to see the page, just as usual. Pressing Escape at any time returns the program safely to *View* command mode.

Stationery sizes

As it stands, V. PAGE will display text as it would appear in a pica font on A4 paper. If necessary, versions of V.PAGE may quite easily be customised for different stationery or for another type pitch. To assemble a new version, changes can be made to the values given to the constants 'lines' and 'chars' in listing 1. These denote the number of lines per page and the number of characters across the width of the piece of paper (not just the length of the ruler).

As an example, normal listing paper is 9.5 x 11 inches, with 0.5-inch tear-off strips either side for the sprocket holes. This gives space for 85 pica characters across (8.5 inches at 10 characters per inch) and 66 lines down (11 inches at six per inch). The dimensions of other common stationery are given in figure 3. The maximum size the screen can accommodate is 82 lines of 160 characters; if the paper is too big, the program still works but only the central portion of the sheet is shown.

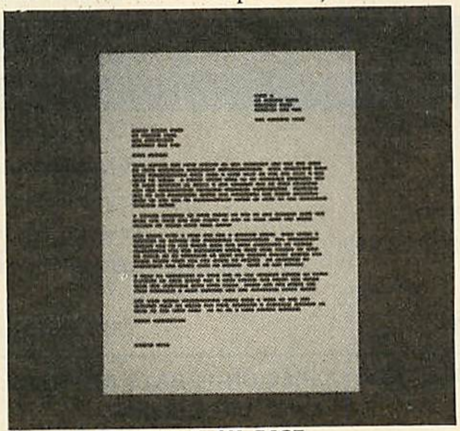


Figure 2. The output of V. PAGE

	lines	width in chars	
		pica	elite
9.5 x 11	66	85	102
14.5 x 11	66	135	162
A5 (portrait)	50	59	70
A5 (landscape)	35	82	99
A4 (portrait)	70	82	99
A4 (landscape)	49.5	117	140
A3 (portrait)	99	117	140
A3 (landscape)	70	165	198

Figure 3. Common paper sizes – assuming one-sixth-inch line spacing and one-tenth (pica) or twelfth-inch (elite) character spacing

When assembling a new version, insert the new dimensions in lines 70 and 80, and change the file name in line 90. When possible, it is a good idea to incorporate some reference to the stationery size and pitch in the filename, for example 'V.PA9x11E'. Only lines 60, 70, 80 and 90 should ever require alteration when making up a new version of V.PAGE.

Early *View* ROMs

Early versions of *View* clear the screen on the completion of every command, which might make it difficult to preview the last sheet of a document. This could be cured by replacing lines 260, 270 and 280 with:

260 JMP osrdch

However, this may cause confusion if SHEETS is used as the machine will wait for a keypress (without prompting) at the end of every page, or if an error occurs. This modification is not recommended because it is simpler to put two page ejects (edit command PE) at the bottom of the document temporarily. This is not needed with *View 3*.

ViewStore and *ViewSheet*

It should be emphasised that V.PAGE will work equally well with any member of the *View* family that accepts normal printer drivers. In particular it may be used to check that output from *ViewSheet* or *ViewStore* will fit the paper in use, as the control over total printing width offered by these applications is sometimes indirect or rudimentary.

With *ViewSheet*, if there is more than one printer window in use, it is sometimes difficult to check that the sum total width of the active printer windows does not exceed that of the printer or paper. If the windows add up to more than 80 columns, *ViewSheet*'s SCREEN command cannot display the layout as it will appear on paper: it can at best display 80 characters across the screen. A trial print run using a version of V.PAGE instead of the normal printer driver can be used to check the layout will fit the printer or paper.

Graphics features

The most valuable feature of V.PAGE (and any modified versions) is that the shape of the 'paper' on screen is the same for all screen modes: pages look the same in mode 0 as they do in mode 5. So the choice of screen mode is constrained only by how much spare memory there is.

A screen page appears to have about the same proportions as the sheet of paper. In fact, the picture is drawn on screen slightly too wide, as the ratio of height to width of a cell (one character by one line) is 1.5:1 on screen, but 1.67:1 for a standard printer in pica mode. The page width is further exaggerated in elite mode, but the distortion is more acceptable. If the 'gxr' flag is TRUE, then the program draws each page considerably faster. This is because the rectangle drawing routines (plot codes 96-103) can replace more complex groups of lines and triangles. Where possible V.PAGE always draws by inverting the present screen colour.

EDUCATION

NEWS

Book publishers bale out

Many of the main book publishers with interests in software publication are abandoning plans for new developments or selling off their software interests. Big names such as Longman, John Wiley and Ginn are involved in the retreat, brought on by a decline in their software sales.

Longman is prepared to continue marketing its existing titles but will not be developing new ideas. They pulled out of their commitment to fund development projects at Loughborough University last year, claiming that costs for any individual new package ran to some £30,000. With average expected sales of most items being around the 200 mark, the chances of recouping that sort of money are slim.

John Wiley has passed over its Jacaranda titles to Ricketts Educational Media. A spokesman for the company told *Acorn User* that it would be concentrating its attention on further and higher education titles dealing mostly with scientific topics.

Ginn has withdrawn all but four of its educational titles. Nearly all its titles were originally written by Cambridgeshire Software House and the copyright of the abandoned titles will revert to them. They plan to re-issue a selection of the titles soon.

It seems that the smaller houses, dedicated to software alone, have more direct links with schools and local education authorities.

Many publish software written by grass-roots users. An idea born in a classroom can be published quickly with low development costs and few production difficulties, so these packages tend to be more immediately relevant to the needs of children and teachers than those developed by large professional software houses.

The rationalisation of operations by the big book publishers should provide important lessons for future developers of educational software.

Master Front Page

Favourite packages in many primary schools *Front Page* and its big brother, *Front Page Extra* – both produced by MAPE (Micros And Primary Education) based at Newman College in Birmingham are to be updated so that they are compatible with the Master.

Front Page is a simple desktop publishing utility which allows the user to create a newsaper title, date and headline and then define an area for graphics and write text into the remaining space. As a medium for creating small-scale class newspapers it takes some beating, since it is so simple.

There is no choice of fonts, no complex disc swapping, no wide range of alternatives to baffle the user. It provides a good introduction to this type of work which will probably lead the user on to *Fleet Street Editor* or *Pagemaker*.

Until now, one major problem was that it was not Master-compatible. Instructions are now available for altering the program so that it will run on all BBC machines. The listing for the modifications appears in the *Acorn User's* yellow pages (see page 113).

Front Page is available only under licence to local education authorities.

Further information about *Front Page* and *Front Page Extra* may be obtained from MAPE, Newman College, Bartley Green, Birmingham.

New pair from 4mation

Dinosaur Discovery is an adventure involving the children in a quest for dinosaur eggs. The children must discover the eggs, return them to civilisation and incubate them.

Zoopack provides a whole host of materials for a study of zoos. The materials, which may be photocopied, are extensive and a good basis for children's folders. Both are available from 4mation at Linden Lea, Rock Park, Barnstaple.

Keep in touch

Get in touch with education news editor Nick Evans via Telecom Gold 83:JNL500 or by post c/o *Acorn User*.

Build your own maze

Logotron have just released a further new title, which complements their *XOR* educational maze game. *XOR Puzzle Designer* enables the user to take the *XOR* drivers and use them in conjunction with custom-built mazes, characters and puzzles.

So a child who has mastered the *XOR* maze itself, may now take the problem solving a stage further. The maze and character creation takes a good deal of forethought on the part of the user. There are three basic stages: creation of a maze framework, creation of the icons or characters that inhabit the framework and testing and playing the maze.

XOR represents a departure from what is conventionally accepted as being 'educational' software. It provides problem-solving in its purest form. The user has to first of all discover what the problem is – and that is rarely explicit until you have made the necessary mistakes – then some solutions have to be tried. Finally the best solution is found.

Those three stages are fundamental elements in any problem-solving structure. Logotron's efforts to provide a mind-stretching exercise for pupils may well however meet with resistance from some teachers who see it as only 'playing games'.

XOR costs £12.95 and *XOR Puzzle Designer* costs £14.95. Both are available from Logotron, Dales Brewery, Gwydir Street, Cambridge CB1 2LJ.

SIMULATIONS IN SCHOOLS

A multitude of scientific software simulations exist for educational use

Chris Drage

Over the past two months we have looked at the role of simulation programs in the humanities. Is it realistic to expect computer simulations to play an equally valid role in science topics?

The computer's role in the teaching of science is fourfold:

- Monitoring and control
- Information retrieval
- Simulation
- Revision

The areas of monitoring/control and information retrieval are closely linked to what science is all about: children engaged in practical activity and learning from first hand experiences. Simulations, on the other hand, enable children to experience situations which cannot be easily or safely provided in the ordinary context of classroom-based education. One of the main criticisms of simulation programs is that, although they may be based on accurate mathematic models, the restriction imposed by the micro's memory means the model is only partially accurate because the computer cannot match anything approaching the full range of all the factors involved.

Simplicity need not be a serious restriction however. Probably the most useful analogy is to compare simulation programs with Bible stories. Originally, Bible stories were told to enable an audience whose level of expertise and understanding was not great, to grasp fundamental concepts in a general way. In this context most computer simulations available today can be considered valuable resources.

Further up the secondary school where specialist applications are required, accuracy is paramount and the value of simulation programs on 8-bit machines is limited. It is arguable that at this level 16/32-bit computers should be used for the full range of computer applications in science. However, in the primary and lower secondary areas where general science and non-specialist applications are the norm, the emphasis is more on group involvement, discussion and problem solving. Simulations can provide considerable enhancement of a topic and will motivate even the most reluctant of pupils.



***Osprey*! from Bourne Educational Software**

At the primary end of the education spectrum, teachers have a wide range of topic-based simulations from which to choose. These range from topic packs to individual programs from a variety of publishers. Typical of the topic pack approach are the *Dudley* programs from Heinemann Computers in Education. Three of the packs – *Food, Myself* and *Weather* – relate to science topics and contain useful simulation programs. Each pack could be used as a complete unit of work, or as a part of a more wide-ranging project approach. The *Food* pack contains a very interesting simulation entitled *Growing a Plant*. Children are offered a choice of three types of plants which they must attempt to grow in a variety of environments. If the children have selected the growing conditions carefully, the plant will flourish. The *Myself* pack has a physiological simulation called *Keeping Myself Alive* and the *Weather* pack contains another simulation *Understanding Weather*. The latter program provides teachers with an interesting means of demonstrating the nature of weather as a moving system, and a cold front in particular.

Often at the primary level, software from a variety of sources can be collected to add to the resources pack for a particular topic. Taking the example of the *Food* pack above, teachers may wish to extend the ideas developed by *Growing a Plant*. They can do this using a program like *Super Seed* from Cambridge Micro Software which allows the child to control a range of environmental variables in order to grow a plant. By reasoned deductions they must discover the conditions necessary for the type of plant to grow.

A very popular topic at the primary level is the study of birds and their habits. Among the range of software available, three simulations stand out: *Osprey!* from Bourne Educational Software, *Golden Eagle* from Cambridge Micro Software and *Migration* from Swift Computing. The former pair of programs are concerned with simulating the protection and management of a colony of ospreys or golden eagles in Scotland. The colony's survival depends on children preventing egg stealers disturbing the birds and managing the tourists who visit the site.

Although *Golden Eagle* lacks *Osprey!*'s delightful animated graphics, it does provide a different challenge. *Migration* is a different kind of flight simulation; a simple yet highly enjoyable program in which children take the role of a swallow and attempt to fly it successfully from Scotland to South Africa. Variables like the wind and the weather conditions dictate the decision whether to fly on or not.

Outer space is a topic which has always captured the imagination of children. By its very nature, practical experience is difficult to come by and computer simulations can play a vital role. *Astronomy* from BBC Software is a good introductory package which simulates lunar phenomena, planetary motion, eclipses and seasons.

Physical phenomena in space are investigated simply but effectively by *Space Tract* and *Space Walk* both from Cambridge Micro Software. The first of these requires children to 'program' a rocket to meet a moving planet, avoiding meteor showers and comets en route. *Space Walk* introduces Newton's three Laws of Motion by requiring children to control an astronaut's movements in space. Such interactive programs as these make a nebulous topic vivid to the children involved.

Teachers considering biology topics based on pond or stream dipping have two excellent simulations from which to choose: *Pond Life* from Granada

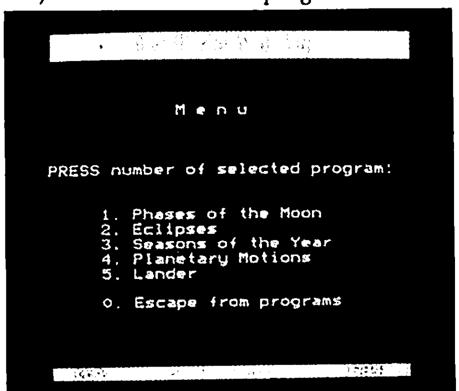
EDUCATION

Educational Software and *Rainbow River* from Cambridge Micro Software. *Pond Life* chiefly provides a simple identification key using words and pictures. It has been designed to enable children to identify netted species. In addition, the software offers a lovely modelling section which allows aquatic communities to be set up in a simulated 'pond' or 'stream'. The effects of natural and human changes on the community can then be studied. A superb booklet accompanies the package. With *Rainbow River* children are invited to balance the flow of sewage and factory waste into a river against the water drawn off to fill a reservoir. The aim is to achieve a balanced system which attracts rainbow trout back to the river.

Obviously programs like *Pond Life, Rainbow River, Astro, Key to the Stars,* etc are relevant to lower secondary science. Perhaps the program by which other simulations are judged at this level is the widely used *Moving Molecules* from Cambridge Micro Software. It graphically simulates the effect of heat and pressure upon molecules. *Moving Molecules* is not so much a general purpose tool as a specific teaching program which has wide relevance to both physics and chemistry. It is one of a range of useful simulations CMS publish covering physics and biology topics.

Arguably one of the most comprehensive introductions to science topices for 14-16 year olds is the Science Topics Software suite from BBC Soft. The 10 software titles have been designed to be used both in conjunction with the BBC TV programmes of the same series or as stand alone simulations enabling pupils to ask 'What if..?' questions. *Waves* is a physics program which allows pupils to learn about waves by actually making (and altering) them on screen. *Relationships* is a sophisticated biology simulation based on data from the World Health Organisation. *Bonding* is a chemistry program designed to reinforce and strengthen pupils' concept of the bonding of elements – 119 interactions are simulated. *Electronics in Action* provides simulations of three computer controlled systems. *Newton and the Shuttle* simulates in three parts the flight of a space shuttle from launch to the recapture of a satellite in space. *Ecology and Conservation* provides pupils with an opportunity to manage a nature reserve in the interests of one of four different groups of people. *Polymers* encourages students to run a manufacturing company. *Food and Population* is a role-playing simulation which examines the problems of feeding a population given limited resources. Other programs in the Science Topics series are not simulations.

Granada Television has been quick to follow the BBC's initiative, producing a number of science simulations to extend the interest generated by ITV broadcasts. *Pond Life* described above may be used in conjunction with several programs in the *A Place To Live* series. *Iron and Steel* is designed to accompany the *Chemistry In Action* series. This three-part simulation challenges pupils to understand not only the chemistry of extracting iron from ore and its conversion to mild steel, but also the economic. technological and environmental factors involved.



***Astronomy* from BBC Software**

Any secondary school which has purchased a Concept Keyboard should certainly find AB European Marketing's introductory software pack a most useful addition to its science resources. Comprising four programs, three of them are simulations in the area of general science: *DC Meters* simulates a multimeter used in a resistive circuit. *Heat the House* simulates the control of a domestic heating system, where all the variables involved in heating a real house can be altered. This is useful for exploring some of the possibilities in domestic energy conservation. *Small Mammal Survey* simulates the techniques frequently used in ecological study fields for the estimation of the size of a. mammal population. Well-produced keyboard overlays accompany each program.

Longman Micro Software publish a substantial range of science software (including many simulations), covering general science, biology, chemistry and physics comprising more than 50 packs. Each pack is part of Longmans's *Computers in the Curriculum* series which aims to provide teachers with different ways to tackle difficult topics. Taking three simulations as representative of the suite: *The Human Reproductive Cycle* models the female's reproductive cycle, accurately showing relationships between time, the state of the ovaries and the uterus. *Floating and Sinking* extends student's practical work in elementary hydrostatics by animating the effects of placing various solid and hollow objects in a range of liquids. Sponsored by the UK Atomic Energy Education Service, *The Nuclear Reactor Simulation* aims to give students an opportunity to control an Advanced Gas-cooled Reactor. Each aspect of the reactor's core, boiler and turbines can be controlled, to optimise the operation of the whole system.

The Dudley Programs are available from Heinemann Educational Books, Freepost EM17, The Windmill Press, Tadworth, Surrey, KT20 6BR. Price: £36.00 + VAT (disc) £33.00 + VAT (cassette version)

Osprey! is available from Rickitt Educational Media, Ilton, Ilminster, Somerset TA19 9BR. Price £10.65 (cassette version) £15.00 (disc version)

Migration is supplied by Swift Computing, Ground Floor, West India House, Welsh Back, Bristol BS1 4SS. Price £13.74

A. Golden Eagle, B. Super Seed, C. Space Track, D. Space Walk, E. Rainbow River, F. Moving Molecules are available from Cambridge Micro Software Cambridge University Press The Edinburgh Building Shaftesbury Rd Cambridge CB2 2RU. Prices; A.–E. £12.95+VAT (disc); £10.95+VAT (cassette); F. £15.95+VAT (disc); £27.50+VAT (Econet).

A. Waves, B. Relationships, C. Bonding, D. Electronics in Action, E. Newton and the Space Shuttle, F. Ecology, G. Polymers, H. Food and Population, I. Astronomy are available from BBC Software, PO Box 234, London SE1 3TH.

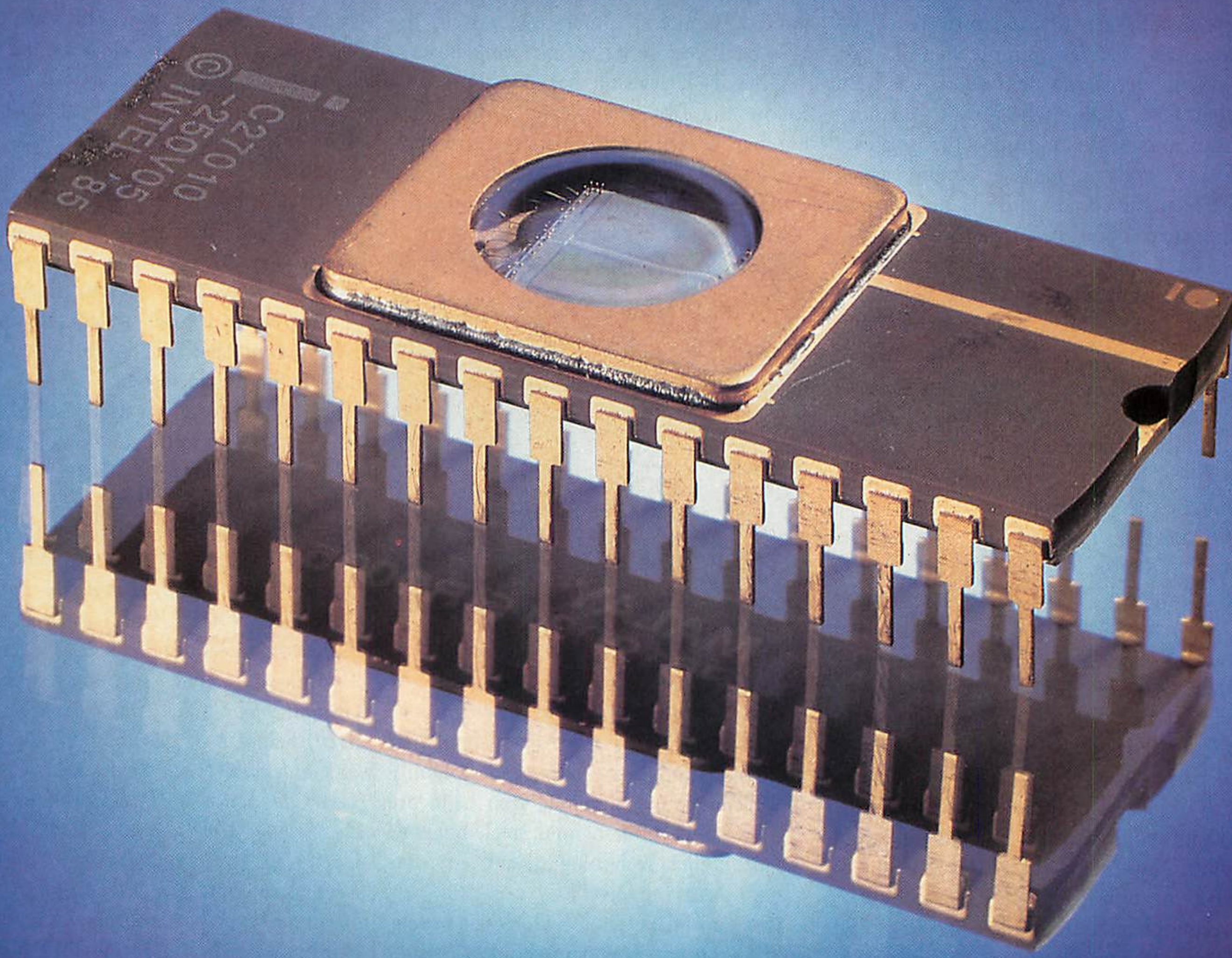
Prices: A.–D £17.20 (disc); E.–H. £23.00 (disc); I. £13.80 (disc) £9.20 (cassette).

A. Pond Life, B. Iron and Steel from Granada Educational Software, Mercury Music Co Ltd, PO Box 194, Sevenoaks, Kent TN15 8TZ.

Price: A. £17.95 (disc) B. £19.75 (disc)

Secondary Introductory Software Pack is supplied by AB European Marketing, Wharfdale Rd, Pentwyn, Cardiff, South Glamorgan CF2 7HB. Price: A3 pack £21.80, A4 pack £21.40

A. The Human Reproductive Cycle, B. Floating and Sinking, C. The Nuclear Reactor Simulation are available from Longman Micro Software Longman House, Burnt Mill, Harlow, Essex CM20 2JE. Price: A. B. £17.50 + VAT, Network: £27.95 + VAT; C. £17.50 + VAT, Network: £27.50 + VAT.



THE NETWORK PAGE

Resetting the clock twice a year can be a tedious business – save time with this program

Robin Newman

This month the subject of the Network Page is time. Twice a year, Britain resets it's clocks. Apart from an hours lost sleep, this brings a further chore for the hard pressed network manager. The Fileserver clock must be reset, and all the internal clocks in Master computers. In my school we now have 10 of these in the main computer room.

I decided that technology must be able to help, and the result is the following suite of programs. These use the time information supplied by an Acorn Teletext Adapter as a standard, and enable time and date information to be transferred automatically between the following combinations:

Teletext adapter sets Fileserver clock (TTTOFS).

Teletext adapter sets Master clock (TTTOM).

Fileserver sets Master clock (FSTOM).

Master clock sets Fileserver clock (MTOFS).

So even if you don't have an Acorn Teletext Adapter, or if you do, but have a level 2 fileserver without a real time clock then there is still something in these programs for you.

The heart of the teletext programs depend on the use of Econet broadcast calls. Two of these are used, one on port &20 transmits the time, and the other on port &21 transmits the date. Two programs are required to transmit information from the teletext adaptor, one (TSENDA) suited to the original Acorn TFS100 Teletext ROM, and the second (TSENDB) to the much better BBC Advanced Teletext ROM (ATS). In the first case (TSENDA) there is no documented user call to provide both full time and date information (including the year) and so I have used the command *DATE to print the date on the screen from where it has been read using the OSWORD 5 (read i/o memory) call (see PROCstore). This is the legal way to peek the screen! This procedure also truncates the *DATE display from dd/mm/yyyy to ddmmyyyy in order to fit the eight-byte limit for the broadcast packet. *DATE is rather slow, and so it is used only once. The time information is obtained from the header display which is selected by being OSWORD &7A and a parameter of &92 (PROCte) placed in byte 0 of the initial parameter block:

os% in PROCte.

Offset	Value	Comment
0	&92	Read subsequent headers to buffer address
1-4	date%	Buffer address to store future headers

This produces an output in the buffer date% consisting of the following:

0	1	2	3	4	5	6	7
C	E	E	F	A	X		1
8	9	10	11	12	13	14	15
8	1			T	h	u	
16	17	18	19	20	21	22	23
1	2		F	e	b		1
24	25	26	27	28	29	30	1.
5	:	4	7	/	1	8	

Where 181 is the current ceefax page number when this data was copied.

Parameter blocks

I hope that readers will by now be becoming familiar with the usual parameter block structure that we have studied over the past few issues of the Network Page. PROCsend transmits the two broadcast blocks. First the date (to port &21) and then the time (to port &20). The date information produced by the teletext header display has the most significant bit of each character set. This is stripped off in line 470. Line 500 checks to see that the date has not changed. If it has then the full date is fetched again using *DATE.

The other parameter blocks used in this program are:

os% in FNread

Offset	Value	Comment
0-3	ad%	Address to be 'peeked'
4	?	Value of address 'peeked'

txcb% in PROCtx (P)

0	&80	Transmit flag
1	P	Port to transmit on
2-3	&FFFF	Broadcast to all station numbers
4-10	time/date	eight data bytes to be broadcast

The alternative teletext transmission program is more straightforward. OSWORD &7A is used to extract both the date and the time, using PROCtcall(P). The two parameter blocks used are:

Offset	Value	Comment
0	21	Parameter to get time
1-8	time	format hh:mm:ss
0	22	Parameter to get date
1-10	date	format dd:mm:yyyy

In this second case lines 230 to 250 compact the date to the form ddmmyyyy. PROCsend(P) works as in program TSENDA. The other procedures in TSENDA and TSENDB merely produce titles, instructions and error messages and so forth as appropriate.

Teletext adapter

The program TTTOM receives the date and time transmitted from the teletext adapter. It then sets the local clock on a Master machine by using a command of the form TIME$="Tue, 7 Jan 1986.09:00:00". PROCrxb uses OSBYTE 52 to make sure that there are a number of network receive blocks vacant and then PROCread (port, station, buffer, blength) receives the data transmitted on ports &20 and &21.

The station number of zero specified here means that any station transmitting on the relevant port will be received. The reception process is really quite complex. First a 'receive block' is opened using FNrxcb. This returns the receive block number allocated if successful. This receive block has the structure shown in the box on the next page.

Offset	Value	Comment
0	0	Initially 0: means open new receive block. Subsequently, block number to be polled/read
1	&7F	changes upon reception
2	port	port number to listen on (&20 or &21)
3,4	0	listen for any station
5-8	Buff.start	Address of buffer to receive data
9-12	Buff.end	Note NFS3.34 puts data here!

Having opened the receive block, PROCread proceeds to poll it until the data is received, or the PROC gives up and times-out. Line 710 reads the data from the internal receive block into the user specified area and then deletes the block.

Although the program is intended for use with a Master machine, it will work on others, although without setting the non-existent clock, but merely printing the date/time value received. In particular, if a machine is fitted with NFS3.34 then the broadcast reception is somewhat anomalous. In this case instead of the eight bytes received being transferred to the data buffer, they overwrite the pointers to that buffer in the receive block. PROCnfs334 checks for this and transfers the bytes to the data buffer as for the case of NFS3.60 and ANFS machines.

Lines 170 to 290 decode the time and date information from the received sets of broadcast data. Line 300 then assembles the time string to set the Master's clock.

Zeller's Congruence

The function FNday in line 300 is based on a relationship called Zeller's Congruence which enables you to work out which day of the week any day will fall upon. It is valid for any date after 1752 when the present calendar system was introduced.

The three parameters needed are d, the day of the month, m for the number of the month (one to 12) and y for the year.

The formula is quite complex. It works by starting off with a known day and date and calculating how much the day of the week had to be shifted to reach any other date. There are three parts to this shift. First the shift due to the date in the month, second that due to the month itself and third that due to the year.

Each day in the month will shift the day of the week forward by one, hence the term 'd' in line 790. Obviously when you reach the end of the week the day cycles back again to Sunday. This is allowed for by line 800 which divides the total day offset by seven and takes the remainder to work out the final day of the week selected. Note A MOD B means take the remainder when A is divided by B. Each year normally shifts the day onwards by one, as there are 365 days in the year and 365 MOD 7 is one. Hence the term 'y' in line 790. If the year is a leap year then an extra day is add. This will normally occur every fourth year and hence the term y DIV 4. However every 100th year is not a leap year although every 400th year will be. These corrections are allowed for with the terms −y DIV 100 and +y DIV 400. This means that the year 2000 will correctly be viewed as a leap year.



Figure 1. A popular teletext adaptor suitable for network use.

The shift in day due to the month is more complex. First of all the uncertainty due to the leap year is eliminated by considering the months in each year from March onwards. January and February are considered as extensions of the previous year (y-1), being numbered months 13 and 14. Line 780 makes this adjustment. An expression 2*m+INT(.6*(m+1)) is used to produce a sequence of numbers which is related to the shift in the day produced by each month. Thus if, March 1 1987 is a Sunday (which is true!), then there is a shift of three days to April 1, (a Wednesday), a further shift of two days to May 1, (a Friday) and so on.

Now we can put together all the contributions to get the final day number. If y=1987 then for March 1st line 780 gives:

N = d + Z + y + DIV 4 − y DIV 100 + y DIV 400 + 2
= 1 + 8 + 1987 + 496 − 19 + 4 + 2
= 2479

The final two merely adds an offset to give the correct day. Then line 790 gives N = 2479 MOD 7 = 1. Finally the FOR . . .NEXT loop in lines 810 to 830 gives the result 'Sun', as day zero is Saturday, day one is Sunday, day two is Monday, etc.

The reserved variable TIME$ will produce an error if it is used on a machine which isn't a Master. In this case PROCerror traps the resulting error (ERR=4) and uses the alternative variable times$ (lower case) to merely print the time using PROCprinttime.

Fileserver clock

The program FSTOM is very similar to TTTOM except that it gets the time from the filesaver instead of the teletext adaptor. Instead of using broadcast calls to do this a direct call to the fileserver is made using OSWORD &14 (see December 1986 *Acorn User*). The parameter block for transmission is:

Byte offset	Value	Comment
0	0	
1	8	Block length
2	0	Port (filled in by computer)
3	16	Code for get time
4	0	{Context handles
5	0	{Filled in by NFS
6	0	{

When the filesaver replies, the block is attended to as shown on the next page:

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0	0	
1	8	Size of block
2	0	Command code :zero if call complete
3	0	Return code :zero if no error
4	d	Day number
5	ym	Composite year and month
6	hr	
7	min	
8	sec	

The date and time string TIME$ is then formed from the data extracted from this call as previously described. One new addition to this program is the use of the varible 'dongle'. Pre-release versions of Acorn's level 3 fileserver, all SJ fileservers and (I believe) the new Acorn Filestore all transmit hours minutes and seconds. However, the release version of Acorn's level 3 fileserver uses a clock module which plugs into the user port, and which is nicknamed 'the dongle' because the fileserver won't work without it! This does not transmit seconds, and so the program has to read the minute value and then wait for that to change in order to set the Master clock to the nearest second. This 'wait mode' is automatically selected if dongle is set to TRUE in line 60.

The program MTOFS performs the reverse function of FSTOM. This program is the only one which will not run on an ordinary model B/B+ or Compact, because these do not include real-time clocks. The time is read from the Master's clock using the call OSWORD &E. Using the parameter block below this returns the time in binary coded decimal format.

The parameter block before the call has function code one in the first byte (byte offset zero). After the call the block then contains the following:

Byte offset	Value	Offset Value
0	year	eg, &87
1	month	eg, &02
2	day	eg, &14
3	hours	eg, &13
4	mins	eg, &15
5	seconds	eg, &47

Details of the call are contained in Acorn's Master Series Reference Manual Part 1 page D.3-23. The function FNbcd is used to convert the values to decimal numbers. Another fileserver OSWORD &14 call is used to write the time to the fileserver. Note the station sending the time must be logged on as a system privileged user for this to work, and in the case of SJ Fileservers the key must be in the SYST position as well. The format of the parameter block used is:

Block offset	Value	Comments
0	0	
1	12	Size of block
2	0	Port: filled in by NFS
3	26	Code for write time
4	0	{Context handles
5	0	{filled in by NFS
6	0	{
7	day	
8	yr/month	Composite byte for year and month
9	hrs	
10	mins	
11	secs	

Once again, the dongle mechanism is employed for Acorn level 3 fileservers, so that the time is set on the next minute change.

The final program is TTTOFS. This program will work on any BBC machine running on the network. Such a machine reads the time from the teletext adaptor broadcast packets and immediately sets the fileserver clock to the same value, unless the Fileserver uses the dongle clock in which case it does so at the next minute change. The constituent parts of this program have already been described in the other programs in which they also occur.

Although the programs are all written in Basic, the time delay between reading and setting a time value is not really significant. By judicious inserts of TIME=0 and PRINT TIME it can be shown that typical delays of 0.2 to 0.3 second occur, which should be acceptable but this ultimately depends on the size of the network and the amount of traffic it carries. Finally, if you use the Acorn teletext chip TFS100, then do save the program TSENDA before using it. Unfortunately this teletext chip corrupts the network workspace when the command *TELESOFT is given, and so you will have to type *NET and log on again after using this program.

When typing in the programs you will find that several of the procedures are duplicated between programs. This means that you can SPOOL them to a file and then EXEC them back again to build up the different programs. For example FNrxcb occurs in both TTTOFS and TTTOM. You may have to renumber procedures to prevent line overlap if you adopt this approach. One other word of warning, do read them through carefully before transferring them from one program to another. Occasionally there are subtle differences. For example PROCfsclockset in MTOFS and TTTOFS differ very slightly!

TSENDA and TSENDB do not alter the channel selected on the teletext adaptor, so you should make sure that the default channel is tuned to BBC1 or alter the program accordingly by inserting a *CHANNEL command.

BST ends on October 25 this year. Now you can be ready and waiting to change all your clocks.

JARGON BOX

Teletext adaptor. A receiver such as the Morley Teletext adaptor or the Acorn Teletext unit can pick up television signals broadcast by the BBC and ITV – the popular Ceefax and Oracle services. The adaptors include software to transfer information from the Teletext pages into the computer.

Ceefax and Oracle may broadcast ordinary pages, City information or computer programs for example. A special downloading routine is necessary to read the computer programs.

ANFS. The Advanced Network Filing System is standard with the Master series Econet upgrade – and is much faster than the standard NFS because local buffers are maintained for BGET and BPUT. Instead of sending or receiving one byte at a time, they are gathered together into larger groups and stored in the micro. So only one network exchange is needed for a group of bytes instead of one per byte so reducing the time taken to transfer data.

Binary Coded Decimal format. A standard six-bit code that is used to stand for letters, numbers and symbols. A seventh bit is used as a parity check.

SPOOL. A Basic program is stored in a compressed 'tokenised' form, with words such as PRINT stored as a single byte. A spooled file is a 'text' version of a program, in which PRINT is stored as five separate letters. *SPOOL FRED followed by LIST, and *SPOOL, produces a file called 'FRED' which can be edited with a word processor.

EXEC. A spool file like 'Fred' can be converted back into an executable file with *EXEC FRED. If the line numbers match, FRED will be added to any existing program in memory.

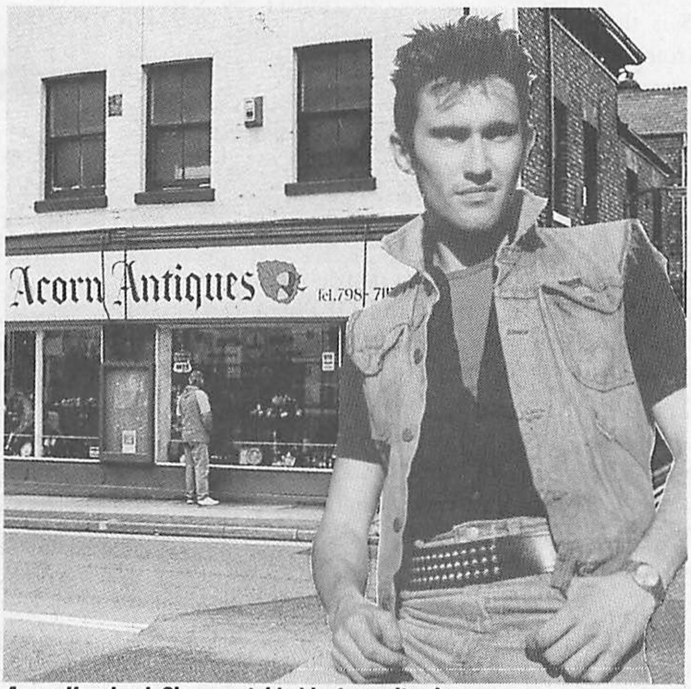
ACORN USER'S

DIARY

Simon struts Stateside

Abuser waves farewell to an old friend this month. Simon Goode is 'retiring' as Advertising Manager, to seek fame in Hollywood. Several film studios are vying to sign up the budding star, but ace reporter and confidante to the stars, Orson Fact, has obtained an exclusive interview. 'I've been screen testing for a leading role in the forthcoming James Dean biopic, and it looks like I've got the part,' says teen-idol Simon. He gladly posed for photographer Holly de Snappe outside the model B warehouse in Manchester.

Simon said that while in the States, he had met senior Acorn executives, who said they were visiting the 'Big Apple'.



***Acorn User* hunk Simon outside his favourite shop**

Lawrence of Arabia

A brand new package from Permanent Memory Systems, *Genie*, arrived in the *AU* office. It gives you a calculator, an address book and all sorts of other 'desk accessories', but all is, naturally enough protected by a password.

Of course the password isn't set when it arrives; there is an option from the main menu to set it when you initially switch the computer on.

So which menu option did Dave 'Arabian Nights' Lawrence decide to investigate first? You guessed it.

Quoth he, 'But I didn't enter a password, I just pressed Return to go back to the menu'. Our *Genie* had surprisingly arrived without a manual, so we had to try to 'hack' our way back in to the system.

For over two hours we tried all the usual passwords people use, AU, HELLO FRED, SEX, and GOD, and were on the point of phoning Permanent Memory Systems to ask for the maiden name of the Managing Director's wife, when with a flash of inspiration someone typed in 'GENIE'. After all that excitement, it seemed a bit of an anticlimax, not even a puff of smoke and three wishes.

The *Genie* manual arrived belatedly the next day as luck would have it. It says: 'Do not use the password option until reading this manual'. Now they tell us.

Compact chaos

Teri North, our gorgeous Italian production assistant, the only one of us who has studied computing, had trouble with her new Compact. After typing for hours she tried to save her work. Horrors, the copy was lost. Teri drags the screaming Graham Bell by the scruff of his neck into the office. Teri had been trying to save her work on the yellow piece of plastic stuck in the machine to protect it in transit.

Meanwhile Smith's *Smell Master* versus *ViewSmell* review finally arrived; covering letter, eight pages of text, screen shots, diagrams, pleas of mitigation. Here's the first line of the bard's manuscript:

```
Spell Master verse ViewSpell
```

'Nuff said?'

Race to Varpon

Abuser proudly announces the release of its new game, *Race to Varpon*. This is a new departure for Abuser, as the game has a book tie-in, *War and Peace* published by Penguin.

The object is to steer your coach and horses down the twisty and narrow forest track, whilst avoiding the huge potholes in the road . . . or something like that. One false move, and the jolting of the troika throws you off the seat and into the jaws of the ravenous forest wolves. Such heroism. Sales are confidently predicted to top even those of last month's game.

```
   1 MO.6:X=10:S=0:P=15
:REP.A%=135:V=(USR(&FFF4
)A.&FF00)/256:V.(1-ABSSG
N(V-32))*94:P=P-INKEY-67
+INKEY-98:S=S+1:X=X+SGNR
ND-(X<2)+(X>20):V.279;0;
0;0;0;2846;31,X,0,42,42,
31,X+15,0,42,42,31,X+1+R
ND(9),0,(RND(2)-1)*79,31
,P,24:U.V<>32:P.'S:*FX15
```

Type the single line in carefully, and program a function key to re-run the program when you crash like so;

*key 0 ¦ MRUN¦ M

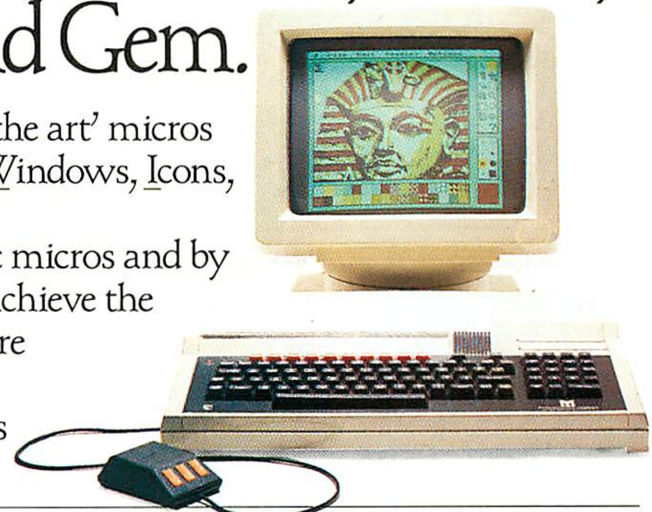
Due 'very soon' is a screen designer utility. The Games Page hopes to publish a set of maps too . . .

A poke has been discovered for *Escape from Voros*, the first free game featured in May's Acorn Abuser. Mr H Pang of Cwmbran reports that:

?&B5E=49
?&B5F=48

enabled him to score over 120,000. But the poke is not compatible with the Master series version of the game!

With the AMX range of Software, you can now forget about the Mac, the St., the Amiga, Windows and Gem.



It's no surprise that nearly all new 16 bit 'state of the art' micros now come with a Mouse and Wimp environment (Windows, Icons, Menus and Pointers) as standard.

With the BBC you already own one of the classic micros and by simply adding the AMX range of software you can achieve the same ease of use, freedom and versatility of much more sophisticated computers.

The AMX Mouse and compatible software – it's what you and your BBC micro have been missing.



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There's not much joy in a joystick and keyboards can be all fingers and thumbs. Acclaimed by the press as 'the best input device', already over 30,000 BBC users have adopted an AMX Mouse. Available for the BBC, B+, Master 128 and Master Compact. Please state version when ordering.

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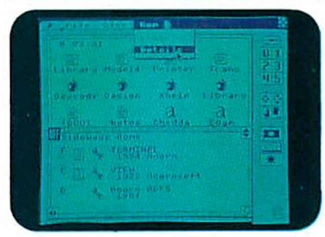




GRAPHIC DFS FRONT END

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MAX provides an easy to use graphic based front end to your computer's disc filing system including a comprehensive set of disc management operations such as cataloging, copying, deleting and re-naming, you can also run programs from within MAX. Available for the BBC, B+, Master 128 and Master Compact. Please state version when ordering.





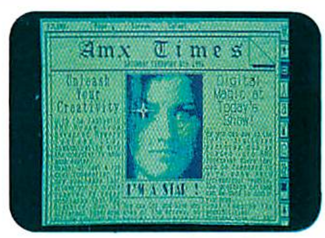
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300k fantastic clip art, over 25 fonts, and utility software.



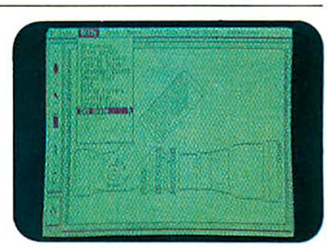


COMPUTER AIDED DESIGN

AMX DESIGN 32K Rom and Disc **£69.95**

A highly sophisticated CAD package allowing drawings such as a PCB design up to the most intricate architectural drawing.

Advanced features include full zoom and macro facilities, 58 x 58 screen canvas, fully supported printer and plotter output. (Launch date Feb. 1987). Available for the BBC, B+, Master 128 and Master Compact.



There is also a growing list of additional AMX software requiring the original AMX Art Rom or Super Art Rom including: AMX 3D Zicon **£24.95,** AMX Database **£24.95,** AMX XAM **£24.95** AMX Mind Games **£14.95,** *AMX Utilities **£14.95,** *AMX paint Pot **£14.95.**

*These programs are only suitable for use with the original AMX Art/Rom which can be purchased with a mouse for **£69.95**

A Mouse (only) can be purchased for **£34.95** direct from AMS, using the order form enclosed in each of the four major software packages (see screen shots).

These superb products are available from all good computer dealers or direct by cheque, access or visa. All prices include VAT and post and packaging.

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Around the World in 40 Screens

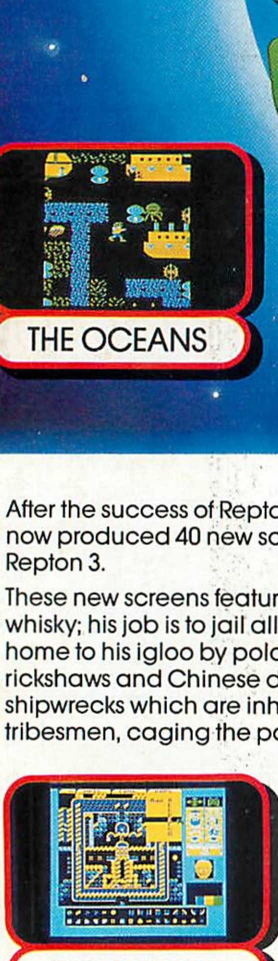
REPTON



Repton Returns . . . to Conquer the World

After the success of Repton 3, we were overwhelmed with requests for us to publish another set of screens for the game. We have now produced 40 new screens which, although enticingly amusing, are even trickier to complete than the original 24 screens of Repton 3.

These new screens feature Repton voyaging around the world. In America, Repton is a sheriff with a penchant for hamburgers and whisky; his job is to jail all the bandits and avenge the Red Indians. The Arctic sees Repton as an eskimo being "hotly" pursued home to his igloo by polar bears and penguins. Across to the Orient, and Repton is a kung-fu master amongst the pagodas, rickshaws and Chinese dragons. Repton becomes a deep-sea diver in the Oceans; he searches for pearls around the rotting shipwrecks which are inhabited by dangerous octopuses and squids. Finally, in Africa, Repton reaps his rewards by defeating the tribesmen, caging the parrots, and collecting the apples, bananas and pineapples — whilst watching out for falling coconuts!



Each copy of Around The World in 40 Screens includes:

- the Repton 3 main program,
- the Repton 3 editor, and
- the 40 new game screens.

BBC Micro Cassette £6.95
BBC Micro 5¼" Disc.......................£7.95
BBC Master Compact 3½" Disc....£9.95
Acorn Electron Cassette..£6.95

(Compatible with the BBC B, B+ and Master Series computers).
The screen pictures show the BBC Micro version of the game.



PRIZE COMPETITION

If you complete all 40 screens of Around The World, you can enter our competition. Prizes include £200 in cash, with Repton mugs, badges, pens and certificates for runners-up. Closing Date: 31st January, 1988.

FREE REPTON BADGE WITH EVERY GAME SOLD

A colourful Repton badge is included free with every cassette or disc of Around The World in 40 Screens.

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